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**The Nature and Experiences of the Dyslexia Population
in Higher Education:
A case study**

Volume I

Mary Elizabeth Eld

This thesis is submitted in partial fulfilment of the requirements of Oxford Brookes
University for the award of Doctor of Philosophy

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Fig 1-1 pg 28

Dedication

I dedicate this thesis to the beloved memory of my late parents who believed I could do this and especially my late father who never quite got to the end of his own research into Equine Grass Sickness.

‘Sero Sed Serio’

Abstract

This research investigated factors influencing the approach of dyslexic higher education students to support in one UK higher education institution. While considering the nature of the population of dyslexic students as a whole, it also looked for potential sub-groups with a view to differentiating support needs and usage.

The research considered data for past dyslexic students of the institution, over nearly a decade, in the context of national data (HESA and UCAS) to establish the nature of the population being investigated. A range of measures were completed by current students of the institution, addressing: aspects of experiences of dyslexia; personality; learning mode preferences; and support use, including DSA Needs Assessment recommendations. These findings, in conjunction with WAIS intelligence test indices scores (where available from dyslexia assessments), were statistically analysed where appropriate. The research concluded with interviews of selected participants.

The main findings included a trend of late identification of women. Evidence of the impact of dyslexia recognition and support during compulsory schooling was seen in subsequent support use and outcomes. How students attributed outcomes at school was important for self-concept and motivation, although this was not always related to recognition of dyslexia or support. The Perceptual Organisation Index of the WAIS-III test was central to grouping participant cases. Patterns were seen in use of higher education support, relating to age of identification as dyslexic, age when starting the course and gender.

The implications include the way Learning Mode preference awareness has a role in developing self-awareness and meta-cognitive skill. Study environment requirements are an area of student needs that would benefit from further investigation. Feedback on Needs Assessment recommendations highlights the need for more training opportunities and better ways to introduce students to assistive technology before recommendations were made. Better understanding of support use patterns has implications for support resource management.

Volume I

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DECLARATION OF OWN WORK

I hereby declare that, except where explicit attribution is made, the work presented in this thesis is entirely my own.

Signed:  _____

Definitions

BDA		British Dyslexia Association
HE		Higher Education
HEI		Higher Education Institution
LADs		Lucid Adults Dyslexia screening
SpLD		Specific Learning Difficulty (Difference)
DSA		Disabled Student Allowances
HESA		Higher Education Statistics Agency
UCAS		University and College Admission Services
SENDA		Special Educational Needs and Disability Act (2001)
DDA		Disability Discrimination Act (1995)
OU		Open University
UK		United Kingdom
Dis-Forum		Disability forum news group
NADO / NADP		National Association of Disability Officers / National Association of Disability Practitioners
RI		The research institution
TWD		Leaving code for Temporary Withdrawal
PIP page		Personal Informal Portal page – data held by the RI, about a student.
(MQn)		Quote identifier – male who only completed questionnaires.
(Fn)		References for interviewee quotes, a gender indicator and reference number within gender e.g. (F1), which is also used to identify any comments quoted from the questionnaires or WAY statements.
RQn		Research question, where n is the number.
(N=n)		Where n is the sample size.
VARK		Visual, Auditory, Read/write, Kinaesthetic - learning mode preference measure.
NEO-FFI / Big-5		NEO Five-Factor Inventory – personality measure.
PCA		Principle Component Analysis, a form of statistical factor analysis.

Notes:

The spelling of comments made on the questionnaires and Who Are You statements have not been changed.

[Dyslexia Background] indicates the source is the measure / file 'Dyslexia Background'.

In the body of the text Appendix 3.1 refers to a complete section of the appendices, whereas App. 3.1 refers to a figure or table, the first figure in the appendix section 3.

Chapter 1 – Introduction

1.1 Background

This thesis presents research investigating the factors influencing the use of support by dyslexic students at one English university. It looks at the make-up of the dyslexic student population in UK higher education and their experience of study.

Government initiatives in recent years have made the identification of the support needs of dyslexic Higher Education students a relevant area to investigate. The new policies include wider participation in Higher Education (HE) and changes to funding for students. When this research was started, the little research that existed relating to dyslexic students in HE, reflected old definitions of dyslexia, which focused on literacy skills only, and took place when support provision in HE was still in a fledgling stage.

A description of dyslexia that appeared in the 2004 handbook of the British Dyslexia Association, (a national body relating to both children and adults) stated:

‘Dyslexia is best described as a combination of abilities and difficulties that affect the learning process in one or more of reading, spelling and writing. Accompanying weakness may be identified in areas of speed of processing, short-term memory, sequencing and organisation, auditory and / or visual perception, spoken language and motor skills.’
(Peer, 2003 p. 73)

Discussion continues in the academic community regarding the existence of dyslexia, while greater debate persists over ways of identifying the presence of dyslexia or other Specific Learning Difficulties (SpLD). For the purposes of this research dyslexia, is assumed to exist and the above description is taken as an operational definition. The means of identifying dyslexia in this research conformed to the requirements of the research institution where it took place i.e. testing by an Educational Psychologist, which usually included adult intelligence tests.

Since the early research, the support provided in schools for specific learning difficulties has developed and expanded, while initiatives to improve access to HE have been introduced. As a result there has arisen a need for research to follow up both the impact of school intervention and to look at the effectiveness or appropriateness of the current support provisions in university for dyslexics. This chapter offers an overview of the

rationale that led to the research aims, the questions which were formulated, and structure of this thesis.

1.2 Rationale

When first considering this research I was conscious, as both a dyslexic person and an Information Technology consultant, that the areas of study strategies and the tools available to dyslexic students had been evolving for some years. In my work as a tutor and Needs Assessor for students with dyslexia, I had also become aware of the rapidly growing number of students contacting both the university's Student Support Services and their Local Education Authority for assistance. This in turn had had an impact on the Higher Education Institution (HEI) where I was working, its view of the support role and how support was addressed.

The expectations and demands placed on universities had shifted in the previous decade, encouraging a widening of the student population. As a result, a question was arising about how the resources of Student Support could effectively cover an increasing and diversifying student population at the start of the 21st Century. Analysis of past and present use of support, as well as a detailed survey of its impact on studies, was needed to generate a wider understanding of dyslexia as experienced at university in general and the research institution (RI) in particular. Such research had the potential to develop a theoretical basis for the provision of support in the research university.

The support resources in HE are funded in two ways, with underlying differences in their approach to disabilities. The Disabled Students' Allowances (DSA) addresses the needs of the individual student by funding support for study, through allowances for: general, equipment, and non-medical personal help. It could be said to adhere to the medical view of disability. It aims to boost the student's resources to allow adequate functioning within the existing 'normal' situation. By contrast, the premium funding from the Government, based on Higher Education Statistics Agency (HESA) disability returns (where permission for inclusion was given by student) follows the social model. When it became clear to HEIs that they needed to modify the courses and/or environments to remove the barriers for dyslexics, by providing reasonable adjustments, this gave rise to strategic conflicts between individualised and centralised support provision. At the time this research was undertaken, premium funding was used by the RI to meet some exam provision costs and

provide support tutors. In addition, funding allowed for the introduction and funding of disability co-ordinators in certain fields.

Another issue was the identification and conceptualisation of dyslexia. Dyslexia is a series or cluster of strengths and weaknesses found across a range of cognitive skills, and it varies between individuals. Literacy skills are one subset of the areas of processing adversely affected by memory, sequencing and organisational problems, whilst some aspects of dyslexia are potentially positive – strong three-dimensional visualisation and non-linear thinking amongst them. The tendency in considering dyslexia has been to note only the difficulties; hence any support offered has negative connotations of previous failure.

When dyslexia is regarded as a disability, rather than an alternative cognitive approach, problems arise. These include the positioning of the support provision within a university's structure, in terms of both physical location and curricula. For the purposes of this research, a holistic approach to dyslexia has been taken, considering the way it affects all aspects of life. For this reason I will refer throughout this thesis to 'dyslexic students' rather than 'students with dyslexia'. As Grant (2005, p. 1) put it: 'Dyslexia is far more than just a label – it is a lifestyle'.

Another conflict arises around the issue of whether support is intended solely for the 'student with disabilities' or whether it also covers the needs of the growing number of students with diverse educational backgrounds. Their common need to be introduced to a range of academic study approaches demands an appreciation, by the university, of the challenges faced by all their students. However, in this research, it was felt potentially helpful to establish a way to profile the unique needs of dyslexic students, which considered students' past experience of learning, the impact of the delay in recognition of an individual's needs, and the student's preferred learning modes or cognitive style. It was also felt to be important to better understand the effectiveness of different support strategies on academic performance in light of current study demands in a contemporary university environment.

At the time of the research, the key factors influencing the support of dyslexic students, at a national level, were Government policy and the resulting structure of disability support within HEIs in the UK.

1.2.1. Government Policy

A move towards 'life long learning' was indicated amongst other things by both the 1995 Disability Discrimination Act (DDA) and the 1997 Dearing Report which reflected Government policy to widen access to HE. This was restated in the Labour party manifesto of 2001. Consequently, since 1997, every attempt has been made to make HE available to more students, including those with no previous family history of university education, those with disabilities that might raise issues of building or course accessibility, and students from a wider age range, including those with additional responsibilities and commitments.

This has had a major impact upon the diversity of the student population. According to the summary of the White Paper *Future of Education* (DfES, 2001, Foreward):

'In the early 1960s only 6 per cent of under-21s went to university, whereas today around 43 per cent of 18-30 year olds in England enter higher education.'

However this did not mean that diversification had been complete, but there is no doubt that it was much improved, as stated in HEFCE 98/39 (1998):

'...women now account for a majority of HE students, whereas 20 years ago they represented one-third. Students from ethnic minority backgrounds, taken together, are well represented (although some groups, such as Moslem women and young black Caribbean men, are still significantly under-represented). And there is now a well established tradition of participation in HE by mature students.'

In May 2001, Parliament passed the Special Educational Needs and Disability Act (SENDA), amending the DDA by removing the education exemption. As a result, support provision became a legal obligation for universities from September 2002, requiring a pro-active, not reactive, provision of 'reasonable adjustments'. Coupled with the diversification of student population, the impact of this policy on support in HEIs was soon seen in the changing nature of, and increasing number of, students who needed to be supported. Support included sessions on study skills, alternative modes or presentation of material, and assistive technology.

Government policy on funding has had a further impact on support provision. It has affected two aspects of student life: the cost of engaging in HE and the amount spent on the education of an individual. On the latter, a draft report for the Welsh National Assembly (Black, 2001) considered the money spent on an individual in HE and expressed concerns about under-funding, stating that:

- Expenditure per student in cash terms between 1992 and 1997 fell in the UK by 21%, largely as a result of increased student numbers.
- Student : staff ratios in higher education have been consistently worsening from 8.9:1 in 1980-81, to 16.9:1 in 1998-99, in the UK'

The Oxford Centre for Higher Educational Policy Studies web site gives figures for the expenditure trends for HE students (Wright, 2002) (see *Figure 1. 1*). This shows the downward trend in spending on HE throughout the 1990's, taken from DFEE data. The costs per full-time student levelled out in 1996/97 and show little influence of inflation since then. From the same point in time, the amount spent on supporting students has dropped by a little under a third while staffing levels have declined.

Figure 1. 1 Student costs taken from the Times Higher Education Supplement (20 Sept 2002)

The University and College Union website (Ashley, 2007) has recently reported on student to staff ratio (SSR):

'Analysis of statistics from the Higher Education Statistics Agency (HESA) by UCU reveals an average of 16.8 students per member of teaching staff in the UK in 2005/6.'

These figures represented a slight increase from 16.6:1 in 2004/05 and a noticeable decrease from a SSR of 18.1:1 in 2003/04. The decrease probably comes from the inclusion of part-time staff in 2004/5. From data in this article, it has been discovered that the case study institution had 17.7 students per teaching staff member in 2005/06.

As for the cost to the student: the introduction of fees and loans for students in the 1990's initially affected living costs only, but more recently has also impacted on the cost of study. Black (2001) went on to conclude that students have become increasingly dependent

on borrowing, the use of savings, and paid employment to sustain them whilst studying.

The consequences of this are that:

- ‘- Take up of Student Loans has risen from 28% in 1990-91 to 72% in 1998-99, with the average amount borrowed rising from £389 to £1,891
- The UK DfEE's survey of student finance found that in 1998-99 students had average net debts of £2,456, compared with £840 in 1995-96. The DfEE admitted that “more students owed considerably larger sums of money, to a broader range of creditors”.’

The changes in student funding at university have put pressure on more people to work while studying and to tolerate a substantial amount of debt when they start work after graduating. These constraints might have affected students’ willingness to use study skills support or learn new technology because of conflicting demands on their time.

The DSA was introduced for undergraduates by the Government in 1989/90 at a time when those who had benefited from integration in mainstream school, as a result of the 1981 Education Act, reached HE (McCabe, 2001). Its focus was on helping the individual. The DSA evolved to include students on an increasing number of courses and in a wider range of circumstances (see *Section 2.4.2*). Dearing’s report (1997, para. 7.41) highlighted the need for removing means testing for DSA and for the DSA to cover a far greater range and level of study.

For HEIs, performance indicators associated with mature and part-time students, student retention and supporting disabled students, linked to premium funding, were introduced in 1999. The disability premium, which provides the second major source of funding for dyslexia support, has been provided as a block grant in the teaching funding, based on DSA receipt figures.

‘This provides institutions with additional funds, on a recurrent basis, to recognise that additional costs are incurred in recruiting and supporting students with disabilities. Our overall disability funding allocation for the sector has increased from £7 million when it was introduced in 2000-01, to £13 million in 2007-08.’ (HEFCE 31/2007, 2007)

The HEIs are relatively free to distribute these centralised funds according to their policy needs.

With the Government keen to increase and diversify the student population, while applying two somewhat conflicting funding strategies for support, HE institutions have had to review their own models, objectives, and structures in order to ensure that the most needy students are able to access support.

1.2.2 Support in Higher Education

A stated aim of the National Committee of Inquiry into HE (Dearing, 1997, Summary para. 12) was to continue:

‘...to produce first degree graduates quickly and with low drop-out rates compared to other countries’.

Two key concerns (Dearing, 1997, Summary para. 5) were to:

‘...encourage and enable all students – whether they demonstrate the highest intellectual potential or whether they have struggled to reach the threshold of higher education – to achieve beyond their expectations;

... to safeguard the rigour of its awards, ensuring that UK qualifications meet the needs of UK students and have standing throughout the world.’

A number of issues emerge from this policy regarding support in HEIs in the UK: firstly, the model of disability used and its implications for policy within an HEI; secondly, the support models adopted and the effect of this on the placement of support within the HEI departmental hierarchy and curriculum; and finally, the impact of widening participation.

Disability models

There are a number of models of disability and dyslexia and the dominant model has shifted with time (see *Section 2.2 Dyslexia*). The two major types are the social/educational model and individual or within person/medical/deficit model:

‘The latter locates difficulties associated with participation in the individual whilst the former accepts people as they are and considers what has to be done to allow them to participate as fully and actively as their non-disabled peers’ Hurst (2000, p. 2)

The DSA started in 1989/90 (see *Section 2.4.2*) and initially awareness of disabilities related to ‘visible’ impairments, such as mobility, vision and hearing. These were often perceived as the main body of users for disabled student support. The difficulties were usually outlined in a medical report, and attempts were made to allow the individual student to access the ‘normal’ course. This may have positioned the approach of student support services in the medical model.

It did not take long for ‘hidden’ disabilities including SpLDs and eventually mental health issues to appear on applications for the DSA. The initial approach to SpLD was a deficit diagnosis in the medical tradition, and subsequently the aim was to look for individual accommodations, not a ‘cure’.

The most common SpLD is dyslexia, which accounts for up to 80% of DSA applications. However, as stated above, there are a number of models of disability, and the differences

between them relate to where the difficulties are perceived to be located – within the individual or the environment. For instance, it has been found that the techniques used in supporting dyslexic students in school, including study skills, ‘actually support and enhance the learning of all’ pupils (MacKay, 2001). This raises the question of whether centralised changes to the course or to institutional environments, to remove barriers, would be more appropriate than individual support. Centralised premium funding for the removal or reduction of barriers to study relates to the social model of disability.

As already mentioned, the Special Educational Needs and Disability Act (SENDA) became law on 11 May 2001. As a result, discrimination against disabled students in the provision of education, training and other related services became unlawful. This gave a stronger legal status to the support provided under the DSA.

On reflection it became clear that my own fundamental attitude, indicated by references to being ‘a dyslexic person’ and an affinity with Grant’s comment about dyslexia as a life style, is within person. While my own experiences, and observation of those of others, do show that society and cultural expectations can either exacerbate or emphasise dyslexic differences, only occasionally highlighting strengths such as spatial skills. My underlying philosophy is pragmatic in that student support needs to achieve a positive academic outcome for individuals (within person) and reforming institution practise and culture is desirable in the longer term (social).

Support models

British education and universities have a tradition of providing moral or pastoral care in addition to teaching aimed at academic excellence, and responsibility for this has mostly rested with teaching staff. This has not necessarily been the case in other parts of Europe and the rest of the world. In the UK the idea of support was initially accepted, and had its origins, in this ‘amateur’ approach derived from the tradition of care. However, the structure was often ‘haphazard and dependent upon individual interest in dyslexia by a member of staff’ (Kirk, 2003, p. 243) (see *Section 2.3*).

There are a number of aspects to support that define the model in use (see *Table 1. 1*).

Student Support Model Features	
• Support staff	• amateur or professional
• Support in relation to the curriculum	• extra curricular or an accredited part
• Role of support	• to facilitate or protect the student
• Nature of support provision	• pro-active or reactive

Table 1. 1 Aspects of Support Models

Position of support

When support first became obligatory, there were a number of formats for support in HE establishments in the UK, depending on the institution’s age and location. This affected the implementation of support provision and its location within a university.

Some institutions viewed support as an extra-curricular activity carried out away from the academic department to which the student was attached, while others saw support as a credit-earning part of the course. Some took the approach that support needed to ‘protect’ the student from the demands of the university experience, while others saw it as facilitating the achievement of potential with reasonable adjustment in terms of access, and the testing of competencies. These differing views affected the allocation of space and the impact of centralising support funding in the form of premiums on the curriculum.

According to the funding decision (HEFCE 99/24, 1999, para. 28), based on *Widening Participation in HE: Funding proposals* (HEFCE 98/39, 1998), institutions were expected to spend money in a number of support areas including:

- ‘Additional academic support and counselling.
- Special retention schemes (for example, mentoring).
- Staff development – in respect of recruitment strategies, retention programmes, and learning and teaching strategies to meet the diverse needs of students.’

Wider participation

Moves to increase access to HE have resulted in a change in the student population. According to Earwaker (1992, p. 2) the HE population is now composed of the following range of students: traditional school leavers and post gap year students; mature students and those with family commitments; the first in a family to go into HE; international students and those with disabilities.

The increased diversity of students' backgrounds and previous academic experience has expanded the range of study and pastoral support they need. Not only do students place new demands on support services; potentially they now come from lower socio-economic groups, ethnic minorities, and include those with disabilities. In addition, recent cohorts of university students have tended to work as well as study. As a result, time management and financial concerns have become significant, as indeed has childcare in many cases.

Students with disabilities have brought different expectations of support depending on the range of provision they had at school or on Access courses. The impact of previous academic experiences in the face of lower contact time (Dearing, 1997, Summary para. 47) and higher student-to-staff ratios has meant that the support role has increasingly moved outside the department of study and into student support services. Students have consequently less opportunity to be explicitly introduced to the academic styles and requirements of their course. Some departments have viewed the role of the support services as corrective/ curative and concerned only with skills, which should be existing competencies. An alternative view of support has included an introductory or developing role. The RI, subject of this study, took the view that support should undertake the role of developing the study and meta-cognitive skills of its students, with a view to transferring them to future employment.

1.2.3 Support in the Research Institution

The research context was a modular teaching environment at a multi-campus 'new' university (formally a polytechnic), which followed a three term system throughout the period of research. There was a mixed support culture at the university. Depending on the department, support either formed part of professional provision focusing on study skills, or, after initial professional discussion, it was undertaken as an amateur service from personal tutors and academic staff. A quality assurance exercise in the Healthcare Department, based on the work of Lea and Street (2000), had demonstrated that a view still persisted amongst some staff that students who had not mastered the required academic style were 'defective' and needed remediation. Others saw it more in terms of these undergraduates needing 'socialising' in the accepted conventions of their chosen academic field.

Professional guidance came from the Student Services Dyslexia Support team, combined with external tutoring, which was offered as extra curricular help by dyslexia study skills

specialists. The Support office was situated in the Counselling and Advisory arm of Student Services. As it was located in the Student Union building, the office was accessible without being conspicuous. Although the Students Union is predominantly an administrative and social campus, it was adjacent to the biggest teaching campus and frequently visited. Even so, the ease with which support could be accessed depended on the student's main study campus, due to the need to travel and the additional time involved to get to the office, and the timetable for the student's course.

To register as a dyslexic student at the university, students were required to provide a dyslexia assessment completed by an Educational Psychologist who used adult tests. Course-based and extra-curricular support was available when the research was undertaken (see *Section 2.5.1*). A key issue, which will be addressed later in this thesis (see *Chapter 7* and *Chapter 8*) was whether the support was meeting the full range of needs and being accessed by everyone who might need it.

1.3. Research Aims

The main research focus was 'The Nature and Experiences of the Dyslexia Population in Higher Education: a Case Study'. This involved identifying the factors which affected the use of support by dyslexic students; the consequences of the student's dyslexia-based difficulties; the role of their personality, and the impact of past support and previous learning experiences on studying. Also, attention was paid to the effect of any delay in recognition of an individual's dyslexia and preferred learning modes. Up until this point, there had been little research into the effectiveness or appropriateness of the support provisions for dyslexic students at university.

The aims of the research were:

- To determine the nature, demographic and characteristic of the HE dyslexic population, nationally and within the RI, with a view to identifying potential sub-groups.
- To examine the actions and experiences of the dyslexic student population before and during their time at the RI and the implications for good practice.

National statistics cover a wide range of institutions from the Russell group, and new universities to art colleges. The rationale for addressing the issue of the population as the

first aim, was that by placing the population of the RI in the national context it would assist others with making informed comparisons between institutions. A review of the background literature provided the basis for five specific research question relating to these aims (see *Section 2.6*).

1.4. Structure

The overall design of the research was based on analysis of existing university databases and subsequently, completion of questionnaires by students. The participants were grouped according to the point at which their dyslexia was identified and the way in which they approached the support services in HE.

Chapter 2 provides a review of the background literature covering dyslexia, support, and government policy in HE; it concludes with five specific research questions. Chapters 3 and 4 cover the methodology of the research, looking at the rationale and materials, then the sample and procedures. Chapter 5 analyses the findings based on documents from an historic viewpoint and determines a representative sample. Chapter 6 focuses on statistical analysis of the questionnaires in relation to dyslexia and personality. Chapter 7 addresses study, support and outcomes in HE, then Chapter 8 looks for possible profiles for dyslexic students in terms of support and study choices.

The final chapter is a discussion linking the literature and findings in the context of the research questions. It reflects on the limitations, implications, and relevance of this research to other universities and as a basis for future research.

Chapter 2 – Background

2.1 Introduction

The focus of this section is a literature review of current thinking about dyslexia in the context of HE, and of student support issues within a university environment. When this study began little research had been done on dyslexic students in HE. Most literature related to identifying dyslexia in children, and its effects within the compulsory schooling system. One of the first books to consider the dyslexic students' experience was Gilroy and Miles (1986) *Dyslexia at College*, which was written for those in HE, both students and tutors. This was followed by a second edition of Gilroy and Miles (1996, subsequently Du Pré *et al.*, 2008), and Riddick *et al.* (1997) *Students and Dyslexia*. Somewhat later came *Dyslexia and Effective Learning in Secondary and Tertiary Education* edited by Hunter-Carsch and Herrington (2001), and Heaton and Mitchell (2001) *Dyslexia: students in need*. The latter was a book based on responses by dyslexic students to a questionnaire, supported by two case histories, which offered a dyslexic's view of the HE experience. Other related work considered the impact of dyslexia being identified in adults (McLoughlin *et al.*, 1994) and the significance of dyslexia in education employment outcomes (Reid and Kirk, 2001). The National Working Party Report *Dyslexia in Higher Education: Policy, Provision and Practice* (Singleton *et al.*, 1999) considered support for dyslexics at a national level.

During this research a number of relevant books were published, including Farmer *et al.* (2002) *Dyslexia and Inclusion – Assessment and Support in Higher Education*, McLoughlin *et al.* (2002) *The Adult Dyslexic – Interventions and Outcomes*, and Mortimore (2003) *Dyslexia and Learning Style*. During the final stages of analysis and write-up, Grant's conference papers were collected and developed in *That's the Way I Think* (2005), Pollak's (2005a) *Dyslexia, the self and higher education*, and Burden's (2005) *Dyslexia & Self-Concept Seeking a Dyslexic Identity* were published.

Also relevant were various publications which considered wider changes in education policy which had implication for the nature of support in HE. The policies encouraged people previously denied the opportunity of entering HE to continue their studies; for instance, some students returned to education, after a break, via Access courses. The 1978 Warnock Report findings and the subsequent 1981 and 1996 Education Acts reflected a policy of equal access to education for disabled students and marked a change of attitude to

disabled pupils in schools (Mackinnon and Statham, 1999). Even so, government aspired to further improvements in participation.

The Dearing Report (1997, para. 29) indicated that the position was that:

‘Despite the welcome increase in overall participation, there remain groups in the population who are under-represented in higher education, notably those from socio-economic groups III to V, people with disabilities and specific ethnic minority groups. Many of the causes lie outside higher education itself, although we recognise that higher education can contribute to improving the situation. We believe that the best progress will be made if the funding of expansion is targeted on institutions which can demonstrate a commitment to widening participation in the recent past, and have a robust strategy for doing so in the future.’

2.2 Dyslexia

‘Think of dyslexia as being a lifestyle – and a style for life.’ Grant (2005, p. 35)

Dyslexia has been the cause of debate every since it was first identified, and has moved through many interpretations, definitions and names. Acceptance has not been helped by the labelling of dyslexia as ‘middle-class’, an ‘alternative’ to being ‘thick’ (Crabtree, 1975) cited in Ott (1997). Snowling (1987) referenced two models of dyslexia, which she calls ‘the medical model’ and ‘the educational model’. Much of the early resistance to dyslexia in the field of education arose from the medical language used to describe it, and the implication that there was no ‘cure’ or solution for an individual’s problems, hence no point in remedial teaching (Miles and Miles, 1990, p. 93). Miles and Miles settled on a model of dyslexia as ‘a medical matter in origin and an educational matter in treatment’ (1990, p. 102). Subsequently the development of a ‘social model’, which considers the barriers and problems to be imposed by society and culture, has placed the difficulties outside the individual.

As a result of the range of approaches to dyslexia, there is no one universally accepted definition, although there is agreement that dyslexia is a complex neurological condition which is constitutional in origin. Synthesising research findings is problematic, not only because of the use of various definitions of dyslexia, but also because of the differing designs and multiple levels of causality in the existing research.

An operational definition of dyslexia was stated in Section 1.1. For the purposes of this research, it has been assumed to be a neurological condition. In order to distinguish between difficulties (dyslexia from dyspraxia, or indeed Attention Deficit Disorder [ADD] or Attentional Deficit and Hyperactivity Disorder [ADHD]) Grant (2001, 2004a and b,

2005) has confirmed the need for detailed information on literacy skills and background information in addition to intelligence scores (see *App. 2.1*). Background information also helps to expose other significant underlying medical conditions that might have contributed to the profile, including epilepsy.

There are also different degrees of dyslexia. The severity of dyslexia relates not only to difficulties shown with IQ and literacy tests (see *App. 2.2*), but also to the ability to accommodate them in the current situation (McLoughlin *et al.*, 1994 p. 50). The *National Working Party Report* (Singleton *et al.*, 1999) concluded that assessing the severity of dyslexia was, and might continue to, be extremely problematic, especially as there can be daily variations in performance levels (Singleton *et al.*, 1999 pp. 105-108). Further, a person who has made life choices that enable them to avoid their weaknesses and maintain a positive outlook might not report difficulties with, for example, reading, simply because they avoid the task and the subsequent sense of failure. Most screening depends upon the participant recognising areas of cognitive difference.

‘A further aspect is the degree of awareness and compensation demonstrated by the student in relation to dyslexia.’ (McLoughlin *et al.*, 1994).

Recognition of dyslexia is often associated with the provision of support. Where support leads to a sense of being understood and the discovery that alternative approaches are acceptable, this has potential ameliorating effects on the severity of difficulty experienced. Some find adaptations to strategies possible at any age, others find it hard to abandon existing strategies that ‘got them this far’. The response to change may relate to personality more than age. Delays in recognition can influence impact of support and choices about further study.

There are also significant social and emotional aspects of dyslexia. Gibberd and Michelson (1999, p. 9) summarised these as:

‘...a clustering of intractable symptoms of cognitive origin, often affecting everything in their daily life and creating a high level of stress, panic, confusion, isolation, fatigue, frustration and lack of confidence.’

2.2.1 Dyslexia Identification

One of the most significant factors for this research is how, and by whom, dyslexia is identified nationally, especially in adults. Linguistically, use of ‘identification’ in relation to dyslexia, rather than ‘recognition’, in this research, is purely arbitrary, and not an

indicator of specific adherence to the ‘within person’ model. There is discussion about the model of dyslexia to adopt: a ‘within person’ (medical) or a ‘social’ one, being the two most commonly used (see *Section 1.2.2 - Disability model*). Problems with identification are of concerns because of the impact of delays in recognition; in particular, the effects this has on a person’s self-perception, their learning achievements and the level of frustration they experience.

Due to the demands on the HE support systems in general, and the costs of assessment in particular, identification for adult students often takes places in two stages, viz: screening and formal assessment. Screening is frequently done through use of discussion in association with the British Dyslexia Association checklist (Vinegrad, 1994), the Dyslexia Adult Screening Test (DAST) (Fawcett & Nicolson, 1998) or software offering a uniform test presentation. The packages available include Lucid Adults Dyslexia Screening (LADs) (Singleton, 2002; Lucid Research, 2002) or Quick Scan (Zdzienski, 1997). A survey (Singleton *et al.*, 1998) cited in Singleton *et al.* (1999), giving details of screening procedures in 93 HEIs, showed that 72% of HEIs used an Adult Dyslexia Checklist, based on the Vinegrad (1994) questionnaire, as part of the screening process. Another overview of UK provision (Ball *et al.*, 2005) contacted 23 institutions and showed 8.7% using a checklist and 17.3% using both LADS and Quick Scan computer based tests.

After any screening, if there are positive indicators, comes formal assessment, which is needed to permit access to support. To ensure effective assessment of adults there are two important points to consider: the existing compensating strategies in use and the nature of the tasks being tackled. Historically, when identifying dyslexia, IQ test assessments were completed by Educational Psychologists, the alternative being teachers’ reports written by staff with a suitable diploma in SpLD needs. For some HEIs a teacher’s assessment had to be replaced by an Educational Psychologist’s report, completed post-16 years of age, due to the nature of the tests.

For most adults, recognition of dyslexia is either a source of relief or a cause of frustration, and it is often an emotional experience (Pollak, 2005a; Sanderson, 2000). Some people question what expectations they should have for the future (Singleton *et al.*, 1999). Some feel vindicated, and feel that armed with the right approaches life could be easier. Others are dismayed and perceive it as confirmation that their goals are unobtainable; they tend to view life with ‘diminished prospects of success’ (Singleton *et al.*, 1999 p. 134).

The results of tests or assessments are expected to give information which allows a person to understand or explain their difficulties, and thereby manage aspects of behaviour or performance better. Intelligence tests, including the Wechsler Adult Intelligence Scale Edition III (WAIS-III), address neuropsychological function. Initially the ACID profile (consisting of low scores in Arithmetic, Coding digit symbol, Information, and Digit span sub-tests) of the WISC-R (Wechsler Intelligence Scale for Children, Revised) was thought a reliable identification of dyslexics (Bannatyne, 1971 cited in Thomson, 1990). For instance, with reference to the Disabled Student Allowances (DSA) for HE students, Cottrell (2000, p. 7) reported that:

‘...some London LEAs [Local Education Authorities] reject all assessments unless there is a pronounced ACID profile (a specific pattern of low scores on the WAIS-R intelligence test) and significant on-going literacy difficulties.’

This method of identification was brought into question by the late 1990’s (Miller and Walker, 1981, cited in Cottrell, 2000; Watkins *et al.*, 1997). Indications were that the profile did not efficiently separate children with disabilities from those without disabilities. McLoughlin *et al.* (2002, p. 53) responded to criticism of the ACID profile, making the point that the profile reflected difficulties with working memory. Contrary to popular belief it did not definitely / definitively identify dyslexia, but did indicate some kind of difficulty.

Moving on from the ‘jagged’ ACID profile of the earlier Wechsler test, the premise that SpLDs could be indicated by variations in WAIS-III test index scores was reviewed by Grant (2005; 2004a; 2004b; 2001). Disparities in the four indices of WAIS-III are expected for SpLD adults (see *App. 2.1, Section 2.2.2* and *Appendix 3.4 i.1*). The four indices of WAIS-III are Verbal Comprehension (VCI), Working Memory (WMI), Perceptual Organisation (POI) and Processing Speed (PSI). By analysis of his WAIS-III indices data Grant confirmed the need for additional details on literacy skills and background information in order to distinguish between various SpLDs (dyslexia, dyspraxia, ADD or ADHD) or expose other significant underlying medical conditions that might have contributed to the profile, including epilepsy.

Dyslexia assessments can indicate a degree of dyslexia – mild, moderate or severe (see *App. 2.2*) – and this sometimes influences the amount of support funding authorities will consider. However, feedback that identifies the stage of competence (McLoughlin *et al.*, 1994), and which addresses awareness, understanding and compensating skills, has been

found to be of more assistance than a severity label (see *Section 8.3.2*). Individuals need to be made aware that the levels of compensation are not automatically successive and might vary in new situations.

Personality traits such as persistence and independence can ensure achievement of goals, though these need not necessarily be academic. Riddick *et al.* (1997) looked at differences in the approach of different students. They showed that the motivation and confidence resulting from adopting an effective approach – such as using alternative strategies – may reduce the impact of the cognitive difficulties. Conversely, poor prior experiences combined with certain types of personality traits may not favour good handling of dyslexia-related challenges

Late identification

When considering identification, Singleton *et al.* (1999, pp. 83-5) differentiated between students who knew they were dyslexic before starting their course and those who were recognised during their studies. The longer it takes the problems to be recognised, the greater the probability that the student will miss exposure to ideas and information, misinterpret their abilities and potential, and form an inappropriate self-concept. It is possible that a number of students did not attempt to enter HE sooner due to not understanding their own difficulties with studying.

Indications that many dyslexic students are not recognised until they enter HE was highlighted by the *Dyslexia in Higher Education* report (Singleton *et al.*, 1999), which reported that 43% of the declared dyslexic population in the HE were identified after entry. Peelo (1994, p. 24) considering first support meetings with dyslexic students said:

‘... being diagnosed as dyslexic for the first time while an undergraduate constitutes a personal crisis.’

Riddick *et al.* (1997, p. 161) considered the impact of protective factors on self-image, including the timing of recognition, and Brown (2002, pp. 146-7) addressed failure and school, whilst Herrington (2001, p. 175) writes that:

‘The insidious effects of earlier misunderstandings and dismissals by schoolteachers can still affect the learning confidence of some of the most resourceful and determined dyslexic learners in higher education.’

According to Grant (2004a), a Chartered Psychologist specialising in assessing dyslexic students from HE, late identification represents the effect of cultural patterns of responding and expectation by staff. The University of Central Lancashire (Coates, 2003) analysed

the age at which a formal diagnosis of dyslexia was made, using a cohort of students (see *Figure 2.1*), which showed patterns of late identification particularly in women. Gender ratios for dyslexia identification have arisen from a number of research projects.

Age at identification and gender

Since the earliest reports of 'word blindness', dyslexia has been seen as occurring more frequently in males, regardless of socio-economic status, race or level of intelligence. By the mid-1980's, the ratio, particularly in school children, was reported as 4:1, male to female, and as affecting 4% of the population severely in the western world (BDA Web site, 2002a; Miles *et al.*, 1998). However, more recent studies suggest that the gender ratio is almost equal, even in 10 year olds - closer to 1:1 (Shaywitz *et al.* 1990, cited in Gilroy and Miles, 1996 – referring to USA children; Singleton *et al.*, 1999 and Richardson and Wydell, 2003 – referring to UK HE students). In part, the gender ratio differences might be the result of using different criteria for dyslexia.

Prior to this study (1995/96), near equal numbers of male and female were shown by the figures across a number of Higher Education Institutions (HEI). Grant (2004a) had reported a ratio of 1.2 males to 1 female in HE, whilst Singleton *et al.* (1999) found 1.6:1, and Richardson and Wydell (2003) found 1.7:1 looking at the 1995/96 HESA data. Grant (2004a) discovered evidence that female dyslexics tend to be identified later, which might be the result of 'hiding' in class to avoid being noticed, and working very hard on school assignments.

Staff from the University of Central Lancashire (Coates, 2003) noted 'clear patterns of late identification particularly of females with specific learning difficulties', within a sample of 279 dyslexic students assessed for DSA at their institution (see *Appendix 2.1*). The sample showed a comparable split between genders (six females to five males). The age groups were primary (<11), secondary (11-15 years), post 16 - Further Education or VIth form College (16-17), university age (18-24) and mature student (25+). Coates commented that initial identification whilst at school was achieved for 'almost 40% of the boys but less than 25% of the girls' (see *Figure 2. 1*, and *App. 2.3*).

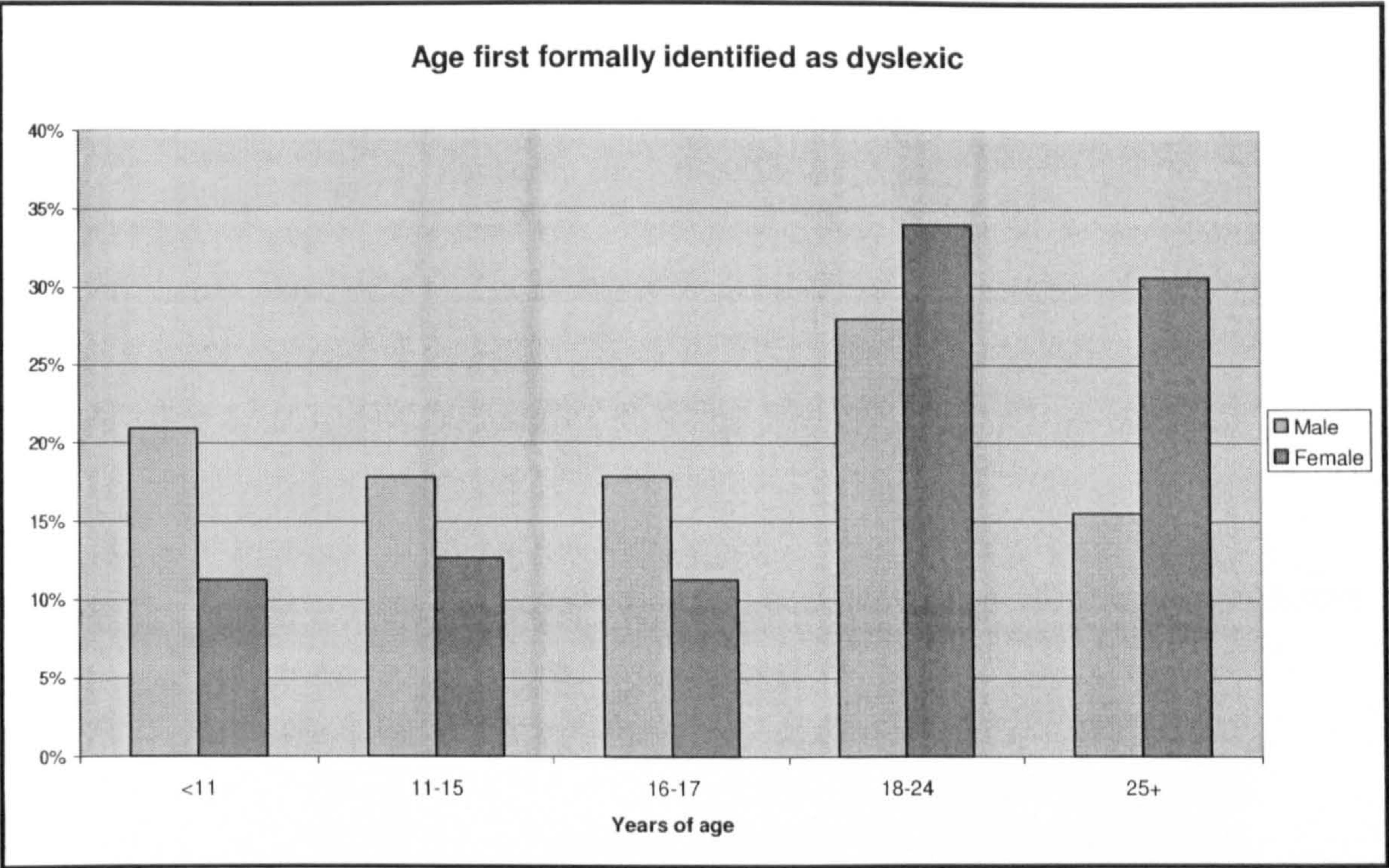


Figure 2. 1 Central Lancashire dyslexic students, age of first identification [Coates, 2003]

The sample was also considered in terms of date of birth (see *App. 2.3*). The younger age group, born after 1978, should have experienced greater dyslexia awareness in their compulsory education as a result of government policy. When only considering younger students the figures for identification at school were boys 41% and girls 33% (N=124).

At the time of Coates’ study it was not possible for any of the younger group to be over the age of 25 when recognised as dyslexic. The comparison was therefore restricted to students identified before the age of 25. There were differences in frequencies for both groups and also age and gender (see *Figure 2. 2, App. 2.3 – App. 2.5*). The biggest change between date-of-birth groups was in identification during ‘A-level’ study, especially for females (see *App. 2.3*).

The older group of students showed greater numbers of female dyslexic students being identified in the mature age group. Overall, nearly a quarter of female dyslexics were over 30 years of age on entry to HE (see *Figure 5.14*). Although dyslexia was better recognised in the students born more recently, those pupils would not automatically continue into HE immediately. A snapshot is offered by *Figure 2.2*, but as more mature students enter HE there could be changes to the figures for school age recognition, as well as later, in both groups. Coates (2003) observed that:

‘The large number of mature female students is interesting, many of these being late returners to education having left school, often with few formal qualifications, and

returning after having families. Quite a few of these are picked up because a family trait is spotted after diagnosis of a child.'

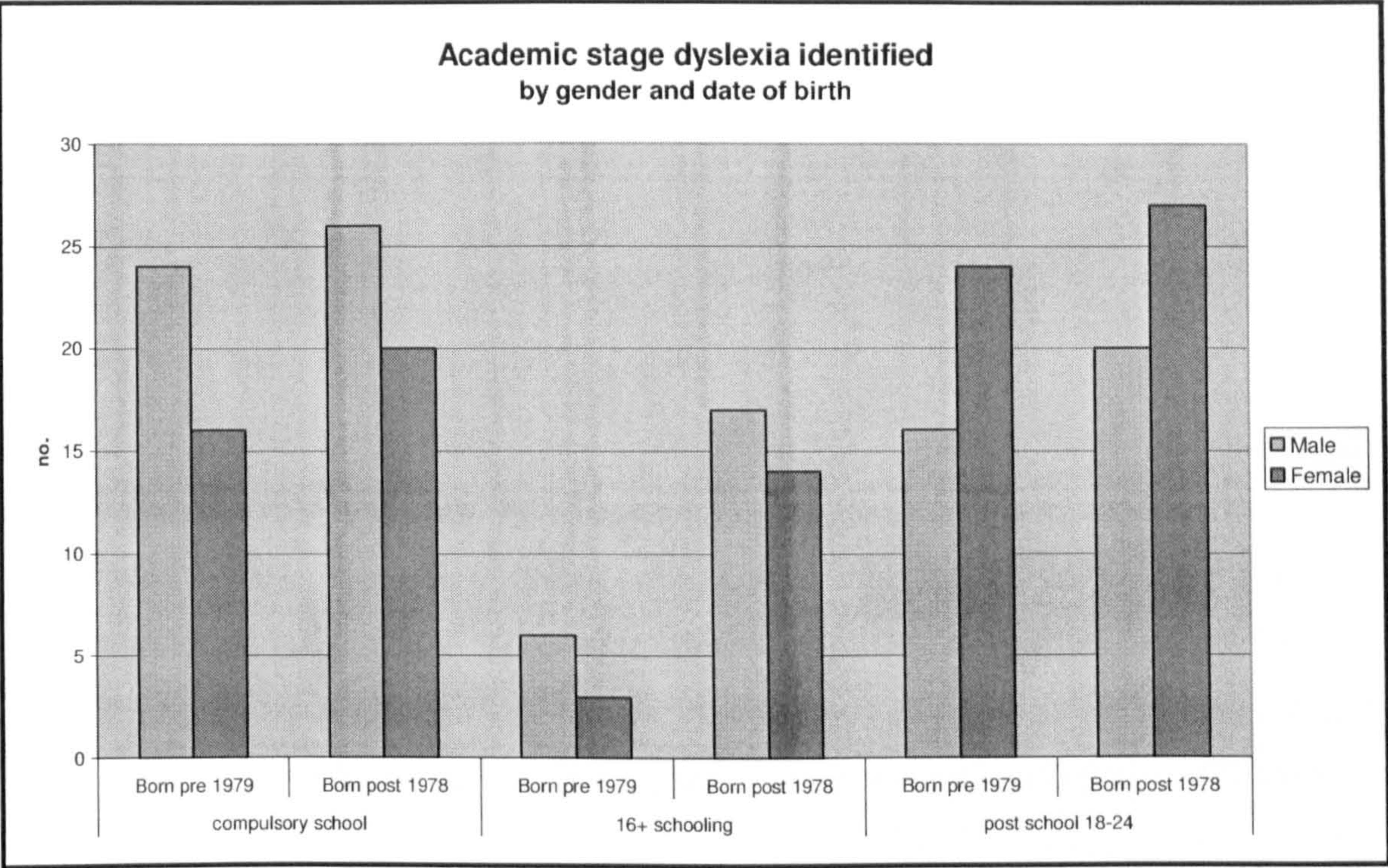


Figure 2. 2 Gender, age identified and date of birth [Coates, 2003]

Grant (2004a) noted from his workload that late identification of dyslexia in women (see *Table 2.1*) was ongoing. The percentage of first-time assessments, within both the male and female population, rose during the time of his research, which might indicate that there were fewer students presenting with pre-recognised dyslexia in need of an update report. Alternatively, it could be that fewer existing dyslexic students were making the transition to HE, although there was little indication of change in the percentage recognised for the first time in HE (see *Section 5.2.5* and *App. 5.32*).

Year	2000/2001	2001/2002	2002/2003
Women	79%	83%	85%
Men	57%	59%	73%

Table 2. 1 Percentage of men & women not previously diagnosed before HE

Some people have suggested that the tendency for late identification of girls might be attributed to a better developed neural language centre until puberty, which may help initial language acquisition skills (Hornsby, 1995). At puberty girls can be as much as 12 months ahead in biological terms (Grant, 2005). Grant goes on to make the point that without gender normalised results, boys would be more likely to score below ‘average’ in test including IQ assessments.

A drop in mature identification numbers might have been anticipated as the amount and degree of support at school increased – the rationale being that the additional people being identified would receive support and would therefore be more confident and motivated to study in HE as their next step. Also, students who were previously only recognised in HE would have been more likely to have been supported at school. However, the nature of HE study and its associated skill requirements mean, in some cases, that there was no need for support before HE, whereas there is on reaching it.

2.2.2 Dyslexic Characteristics

This section looks at the characteristics of dyslexia, its effect on interpreting experiences, and its impact on self-concept. The characteristics giving uneven profiles in the WAIS scores relate to working memory, coding, sequencing, and processing speeds. The literacy tests look at speed, and accuracy of spelling and reading in comparison to the VCI score.

Personality and experience combine to influence the ability to handle dyslexia. The social and psychological aspects of a dyslexic pupil's experience in the classroom may cause as many difficulties as the dyslexia itself, and be just as much a cause of under-achievement lasting into adulthood. Past experience helps define how a person sees themselves and their decisions about learning. As Hallam (2005, p. 1) states:

‘Central to the unconscious selection of what to attend to and what to learn is the self, which itself is learned and developed through our interactions with others.’

Singleton *et al.* (1999, p. 87) report that students:

‘...often have deep seated anxiety about their abilities and are worried about what the assessment may reveal.’

Anecdotal evidence indicated that both testing and any re-testing induced a dread of being found to be a fraud for some students, however closely they identified with dyslexia or how well established their history of dyslexia.

Farmer *et al.* (2002) published findings on assessment and support in HE from two UK universities. Their questionnaire covered prior awareness of dyslexia in the students and their attitudes to dyslexia, previous assessments and knowledge of what a dyslexia assessment would entail. Their data showed that 87% of the dyslexic students found that assessment changed their self-perception in a positive direction.

Personal interpretation and the attitude of other people towards the characteristics of dyslexia affect the model or concept a person holds of their self. The following sections consider the attitudes held to: self, dyslexia, support, and university; and what they contribute to motivation, academic self-concept, and what is perceived as a 'possible self'.

Self-concept

Self is a learnt social construct, rather than an instinctive one; it is central to personality and adjustment, and is shaped and changed by experience (Burden (2005, p. 5-14). Peelo (1994, p. 24) comments that when first identified:

‘...how a student feels about themselves substantially shapes how they respond to the tag “dyslexic”.’

The natural tendency is to guard against loss of self-concept and the resulting anxiety (Burden, 2005 pp. 5-14). For instance, success or failure in a highly regarded area has greater impact than could be expected, given reactions in other areas.

How dyslexic experiences are accounted for or attributed has a role to play in developing a positive self-concept and being a successful student (Humphrey and Mullins, 2002; Dweck, 2000; Dweck and Elliot, 1983). Terras *et al.* (2004), in work with children, found that while the global self-esteem of dyslexic children was no lower than that of their peers, there was a deficit in self-esteem in relation to ‘scholastic competence’. Children with better understanding of their dyslexia and parents with positive attitudes to dyslexia had higher self-esteem. Humphrey and Mullins (2002, p. 200) found that dyslexic pupils formed strong positive association between reading, intelligence and being hardworking, probably because they were labelled ‘lazy’, even unintelligent when failing with reading.

The attribution questionnaire used by Humphrey and Mullins (2002) showed that dyslexic pupils tended to have two unhelpful concepts when it came to protecting their own self-image; i.e. they tended to interpret both success and failure as the result of external factors over which they had no control. These are unhelpful because attributing success to an external factor fails to produce the warranted positive reinforcement of self, whereas when the cause of failure is seen as a relatively stable external factor which one cannot control, this can induce helplessness. Not all dyslexics take this path, and it is of great importance to gain a better understanding of why this is the case, because support needs to empower the student, rather than being an external factor that can be withdrawn by others to

detrimental effect. Differences in school ethos can prevent helplessness; relevant factors include early identification of dyslexia, how valued dyslexic students are in the school community, and how much thought is given to developing self-esteem (Humphrey, 2001).

Work by Dweck and Elliot (1983) has shown the effect of feedback and expectation patterns on children's own expectations. Girls attribute failure to internal things such as ability, and success or positive feedback to external causes. Therefore, when girls fail, they assume that the teacher is right, that they lack intellectual ability and that this is a stable entity, so they tend to stop trying. Boys by contrast blame an external factor, such as the teacher, and retain their faith in their ability to do better next time. Referral bias (Wagner and Garon, 1999) cited in Grant (2005) is potentially a result of this female acceptance that if they want to 'keep up' they have to work harder rather than becoming disruptive.

Riddick *et al.* (1999) have shown that there is a vicious circle of literacy difficulties leading to high anxiety, which then means feeling more threatened by negative feedback, and loss of self-esteem (more stressed, more literacy difficulties). Their research showed that dyslexic HE students have significantly lower self-esteem than the control group. They referred to Thomson (1990) whose work showed that social and academic self-concepts could be damaged by the dyslexia experience but restored by a change in schooling environment. Burden (2005, p. 13) stressed that there is uncertainty about the length of time negative feelings arising from early literacy difficulties last. This shows that, along with early identification of dyslexia, recognising levels of anxiety and self-esteem and then improving them, should be an important part of support strategies. The research shows women were more likely to externalise success than men, and that dyslexics were likely to externalise or put success beyond their control.

Goals and models of intelligence

The model held of intelligence or ability is one of the most important factors in developing a sense of control and so finding effective coping strategies. How intelligence is conceived influences the self-concept a student develops (Dweck, 2000, pp. 2-4). The learning goals a person adopts affects how outcomes are experienced and in turn, the attribution of outcomes to factors underpins future expectations. The focus of praise on factors that can be controlled is important (Dweck, 2000, pp. 120-121).

People who hold a model of intelligence as fixed and immutable (entity theory) tend to select performance goals with which to demonstrate competence in comparison with others. This group try to avoid negative situations where they could look foolish or inept (Dweck and Leggett, 1988), cited in Hallam (2005). By contrast, the incremental model of intelligence allows for mastery goals, learning new things, gaining understanding and increasing skill levels. The incremental model holder willingly accepts being stretched or challenged by a new task, and applies effort to counter an apparent lack of ability.

Where ability is the focus of praise, failure suggests that the limit has been reached and, if a fixed entity model is adopted, then withdrawal of effort is the likely response. Frequent failure attributed to stable internal causes can lead to passive acceptance without motivation (learned helplessness - Seligman, 1991 p. 5 cited in Burden, 2005 p. 12), unless a student has a 'mastery orientation', in which case the response is active and more effort is put into achieving the task. Praise for effort and strategic skills, which can be controlled, rather than intelligence, encourages an incremental model of intelligence, use of mastery goals and better abilities to handle setbacks (Dweck, 2000).

Personality and study (self-control and organisation)

Personality is influenced by hereditary components and character. Hereditary aspects of personality or temperament are considered to include adaptability, sensory threshold, mood, distractibility and persistence, which are potentially relevant for learning (Thomas and Chess, 1986). Even an inherited trait can be modified by environment and experience (Anastasi and Urbina, 1997, cited in Neill, 2005), just as the way in which a gene manifests itself is dependent on both the 'shared' and 'unique' environment experienced. Research into why identical twins, raised in the same situation, are only about 50% 'alike' has indicated that 'shared' environment has far less impact than the 'unique' individual experiences (Pinker, 2002b). Studies of twins have also indicated that deficits in reading and spelling are substantially genetically determined, but by no means 100% so (Snowling, 2000; Raskind, 2001). Other traits arise from personal experiences and environmental factors.

The aspects of nurture are not clearly understood, but it has been shown that non-genetic elements of personality are not strongly affected by shared environment such as home and school. The 'unique' environment formed by a string of chance events, individual experiences and the personal perception of this potentially holds the answer (Pinker,

2002a) and accounts for up to 50% of personality traits. Chowdhury (2006, Introduction) considered students' personality and study approaches, concluding that:

'College students tend to prefer learning environments consistent with their own personality type preference.'

Personality is commonly addressed by a five-factor model that covers; Neuroticism, Extraversion, Openness, Agreeableness and Conscientiousness (Costa and McCrae, 1992). The characteristics of Openness and Conscientiousness are related to learning style according to Blickle (1996). The role of personality in learning outcomes was considered by Heinström (2000, Section: The Relationship between the Five Factor Model Personality Traits and Learning):

'The student's personality was related to learning outcome mediated by learning strategies.'

She observed that conscientious students who use the strategic approach:

'... are good at organizing their work, managing their time and work hard in their studies. They care about their working conditions and have clear goals for their studies. (Entwistle and Tait, 1996). They have an intrinsic motivation and a positive study attitude (Entwistle, 1988).'

Work on the extrovert-introvert dimension of personality (Eysenck, 1967), cited in Cassidy and MacDonald (2007), looked at the impact of sound on study. The research showed that all tasks were better performed in silence. However, it did not address willingness to undertake work in these conditions outside the experiment, or the length of time that performance could be sustained. Cassidy and MacDonald found introverts were more conscious of making deliberate choices about background music, as they were more easily distracted by noise or music when compared to extroverts. Extroverts were happier with a more stimulating environment.

Dweck (2000) considered that either people perceive personality as a fixed entity or as something incrementally changeable, similar to the models of intelligence (see *Section 2.2.2 – Goals and models of intelligence*, above). The model adopted is then applied to both self and others. When personality is seen in terms of a fixed entity, she states that individuals:

'...measure and judge themselves quickly, labelling themselves as deficient after a social rejection and curtailing their efforts to form a relationship.' (Dweck 2000, p. 74)

When an incremental view is taken, it leads to a belief in the possibility of changing behaviour, attitudes and emotions as a means to change personality. The individuals who

adopt this incremental view are more likely to attribute a failure to the need for more effort and clarification in order to make things work.

Dyslexic personalities

Riddick *et al.* (1997, p. 13) refer to the findings of Scott *et al.* (1992) who interviewed successful adult dyslexics. They found that:

‘When asked what made them successful, they highlighted “persistence, hard work and their internal personal drive”’

Riddick *et al.* also report that their case studies showed differences in personality ranging from assertive bordering on aggressive and unlikely to appease people, to the anxious, self-critical and withdrawn.

Herrington (2001, p. 175) identified several learning stances for dyslexic students, pointing out that where:

‘...students have a very positive personality, a strong belief in their own values as a person and have had an early ‘diagnosis’ and background support from family and friends, then their position in terms of self-knowledge about dyslexia can be enhanced and their ability to cope with new demands in new situations is often increased. Dyslexia for such students is often not experienced as the crushing, disabling burden so frequently described, even when the degree of dyslexia is relatively severe.’

Herrington (2001, p. 175) also noted that where ‘a major struggle against negative stereotyping by teachers’ occurred, the learning stance can differ greatly between students even though the dyslexic difficulties were similar in nature and degree.

Motivation for entering Higher Education

Attitudes develop from interpersonal relationships and are the result of beliefs held, their strengths, combined with predisposition. Personal views and motivation are influenced by exposure to the attitudes of society and individuals. Motivation is derived from success; it involves a sense of what is possible, and revolves round a personal concept of ‘possible self’, which directs goal choices. Experience, constrained by the environment or situation, has an impact on motivation. Interim goals pave the way to success and in turn generate motivation, which plays an important part in learning (Ericsson and Chase, 1982, cited in Hallam, 2005). The personality trait of ‘Conscientiousness’ can indicate the degree to which one is goal driven (Costa and McCrae, 1992 pp. 15-6). To sustain motivation, the interest must be internalised, becoming part of an individual’s identity. Dyslexia results in at least some experience of failure, and how these aspects are reconciled is an important element in the motivation of dyslexic adults.

Learners who attribute learning difficulties to factors beyond their control tend to avoid challenging tasks because they fear failure (Dweck, 2000). To continue beyond compulsory education needs motivation built on past experiences, for interim goals to have been successful and a 'possible self' as a student to have been internalised. As has been noted, 'success and on-going improvement in performance maintained the student's motivation' (Ericsson and Chase, 1982) cited in Hallam (2005), and experience of success can lead to the development of a 'positive possible future self' (Markus and Ruvolo, 1989) cited in Hallam (2005).

According to Biggs (1987) cited in Mortimore (2003), three approaches to learning – Surface; Deep; and Achieving (Strategic) – are motivated by personal, vocational and competitive reasons. In the context of the approach adopted, Entwistle (1997) considers the students' objectives when studying, in terms of three different factors: personal interest; course demands, and maximising success.

2.2.3 Learning in Higher Education

Academic learning is a specific task within a range of cognitive processes. The learning process is influenced by the students' objectives (see *Section 2.2.2 – Motivation for entering HE*, above), their natural mode of learning, and their study personality. These factors determine what happens at each stage of learning. The stages can be summarised as input, processing for storage, and recall for output or presentation to others. The mode of presentation for input needs to permit ready formation of the information into units, which are meaningful for storage and appropriate for the required final output. The content and the task combine with modality to influence the appropriate form of unit. There is some evidence to suggest that matching presentation with styles has a role to play in academic success (Given and Reid, 1999) cited in Mortimore (2003).

Learning personality

Everyone has characteristic ways of thinking, remembering and problem solving which can be labelled as their 'cognitive style' (Mortimore, 2003 pp. 7-12) (see *App. 2.6*). Cognitive style is thought to be of a relatively fixed nature and to be influenced by the personality and sensory strengths of an individual. Learning style is a practical 'application of this cognitive style' (Mortimore, 2003 p. 20). Mortimore expands on a range of models, relating to approaches to a learning situation. The behaviours addressed cover aspects of

intellectual development, motivation, self-concept, types or modes of processing, and hemispherical specialisation. Coping with the wider aspects of HE, such as course administration, registering and using support, could also be influenced by cognitive style.

Cottrell (1999) encourages students to identify their learning style or study persona and offers the Diver, Dreamer, Logician and Searchlight (see *App. 2.8*) as general types. Entwistle *et al.* (2001) summarise four possible HE student personalities (Heath, 1964; Perry, 1970). The first three (non-committers, hustlers, and plungers) are all potentially the basis for developing the personality of a 'reasonable adventurer', namely curious, critical, and reflective (Heath, 1964; Grantham, 2002). Dyslexic students might be expected to show the same range of student personalities but the frequencies might differ, and the manifestation of the dyslexia could vary with student personality.

Learning styles

Mortimore (2003) refers to learning style as the use of strategies which reflect the nature of the task within the parameters of a relatively consistent cognitive style. She addressed five aspects of cognitive style or learning style. The key point is whether learning styles are fixed or changeable, and if changeable, whether the driving force is maturity or experience. The work of those theorists who identify different stages of human development suggests that awareness and use of learning styles requires the attainment of certain levels of thinking (see *App. 2.7*). By HE, students are expected to be comfortable with abstract thinking; however, maturity (giving flexibility of thought) has not necessarily been found in university students (Entwistle, 1988) cited in Mortimore (2003, p. 10). Exposure and experience of styles also contributes to the ability to use more learning styles. Part of this development includes meta-cognition, or conscious self-knowledge about one's own ways of working and thinking (McLoughlin *et al.*, 2002 p. 17, 108; Stacey, 2004).

The mode (Visual, Auditory, Kinaesthetic (VAK)) selected for learning is part of cognitive style and it is influenced by environment and experience. However, a preference does not automatically indicate a strength. The modes relate to preferences for providing or receiving information. Reading/writing and Tactile are further modes that appear in some models (VARK and VAKT).

Gardner (1993b) presents multiple intelligences (MI) as an alternative to the VA(R)K view of learning style (see *App. 2.9*). He initially identified seven types of intelligence –

Linguistic, Logical-Mathematical, Musical, Bodily-kinaesthetic, Spatial-visual, Interpersonal, Intrapersonal – which Riddick *et al.* (1997, p. 175) consider in conjunction with degree subject choice and styles of learning associated with the choice. Their research showed that dyslexic students had a consistent problem with linguistic learning modality, although their strengths and strategies differed. Gardner (1993a) indicates that the use of learning style depends on the content or ‘intelligence’ rather than being generic and determined by the student.

The ‘literate dyslexic’ is occasionally mentioned in publications (McLoughlin *et al.*, 2002 p. 11), but does not automatically equate to a ‘compensated dyslexic’ (Singleton *et al.*, 1999 p. 106). There is anecdotal evidence of the concept of the dyslexic ‘bookworm’ where the difficulties lie in speed of input, and written tasks, but not comprehension of text. Riddick *et al.* (1997) emphasise that dyslexic students sometimes undertake courses that demand linguistic learning – through saying, hearing, and seeing words. This is contrary to expectations based on Gardner’s framework, and serves to make the point that a distinction may be needed between difficulties at the input and output stages, as opposed to problems understanding verbal based concepts.

Keefe (1987) cited in (Reid, 1998) uses three dimensions to address learning styles. The first, the cognitive dimension, is of interest as it includes mode preferences, attention and memory skills. The second, the affective dimension, covers personality and its impact on perseverance, handling frustration, co-operation, and motivation. The final dimension is physiological and amongst other things includes environment and optimum time of day for study. This was developed further in the Dunn and Dunn model (1993), which included increased focus on environmental and social elements while shifting the emphasis from the cognitive dimension to the processing styles of the psychological domain (see *Table 2. 2* for summary). Given (1996) was cited in Reid (1998) for combining elements of personality type with the learning style model of Dunn and Dunn, to give a model of learning and teaching and the nature of response to tasks and events (see final column *Table 2. 2*).

Variables / Domains of experience	Elements – Dunn and Dunn (1993)					Personality – Given (1996)
Environmental (reflective)	Sound		Temperature	Light	Layout – seating etc	Inquiry
Emotional	Motivation		Degree of responsibility	Persistence	Need for structure	Intuition
Sociological	Working alone - Self	Pairs	Working with peers	Team	Motivation / Help / support from authority figures	Empathy
Physiological	Perceptual - Modality		Intake – food / drink	Time of Day	Mobility	Ambition
Psychological	Global / holistic	Analytical	Hemisphericity	impulsive	reflective	Analysis
↔ Simultaneous or successive processing ↔						

Table 2. 2 Summary based on Dunn and Dunn learning style model (Text) and Given (1996) cited in Reid (1998)

The Environmental, Sociological, and Physiological domains of the Dunn and Dunn model underpin the case for the DSA recommendations, which aim to facilitate a successful study environment (see *Section 2.2.3 – Coping strategies*) as well as to provide assistive tools and personal support. A computer and printer with MS Office might be all that is needed. It will help because it can be located in such a way that the student can take steps to control their environment. For example, it allows them to take breaks without packing up their study materials, and to tailor screen settings and layouts (see *Section 2.2.3 – Coping strategies*).

Reid (1998) considers learning styles in relation to dyslexic children. He questions whether it is appropriate to modify students’ learning mode preferences in view of the learning task. He concludes that it is part of the teacher’s role to highlight preferred and appropriate learning styles with a view to encouraging students to be flexible. This awareness of strengths and weaknesses in different modes is the basis for the meta-cognitive higher level thinking skills needed to handle HE study well, especially as a dyslexic. However, by the later stages of this research, thinking on learning styles was being greatly challenged by Coffield *et al.* (2004).

Coffield *et al.* (2004) identified five categories of learning style models, ranging between those which hold that learning styles are pretty well fixed, to those which represent them as flexible and open to change (see *Table 2.3* summarised from Coffield *et al.*, 2004). Some models focus more on learning styles and others on mode of presentation. According to their report, there is some evidence for learning environment making a difference, but little

to show any genetic impact on personality or cognitive characteristics strong enough to affect style.

Family of learning styles	Theorists	Fixed style?
Constitutionally based (VAKT) Work with style rather than change it - Match	Dunn & Dunn, Gregorc	Genetics personality Immediate environment (D&D)
Cognitive structure (pattern of ability)	Riding	
Stable personality type (learning style one of them)	Myers-Briggs	
Flexibly stable learning preferences	Kolb, Honey & Mumford	Interplay self & experience
Learning approaches, & strategies orientations & concepts of learning Can change learning styles	Entwistle	Personal factors – motivation, environment & tasks

NOTE: there are more theorists in all ‘families’

Table 2. 3 Families of Learning Style theories (Coffield *et al.*, 2004)

In summary, a ‘learning style’ is open to modification and represents the day-to-day strategies a student adopts. A preference for a learning mode is influenced by task, environment, and experience, and does not automatically indicate use of a strength. At the end of her book Mortimore (2003) indicates that there is doubt about the generic nature of learning styles and that they may vary with content and task. The evidence that dyslexic students are predominantly visual learners is at best inconclusive.

Meta-cognitive skills

Reid (1998) refers to the model of Brown *et al.* (1986) which focuses on four elements to a learning situation, namely: the content or text to be learnt, the purpose of the task, the strategies adopted, and the characteristics of the learner. These characteristics include past experience, existing knowledge, interest, and motivation.

Meta-cognitive skills consist of having knowledge and awareness of one’s own mental processes, way of thinking or learning style – ‘knowing about knowing’ (McLoughlin *et al.*, 2002 p. 17, 108; Stacey, 2004). This awareness is linked to taking responsibility for ‘fine tuning’ one’s own learning strategies by evaluating outcomes. Group or pair work, where one person vocalises their thought process on how to tackle a task to another, helps to develop the skill. Review of the outcome encourages feedback on the assumptions and criteria used. Knowing what the options are, and one’s criteria for using them, are important skills for becoming a successful student.

The evidence for the benefits of knowing about learning styles, both identification of them and adaptation to them, is limited. People generally like doing questionnaires, which highlight the type of task-related decisions they make, and receiving feedback on learning

techniques that might suit. An improvement in meta-cognition occurs simply from raising the issues of how a person learns, how they prefer to give or receive information, and suggesting that there are choices. Encouraging a responsible pro-active approach to study is always likely to be helpful, especially at the less structured level of higher education.

Higher Education study skills and dyslexia

Writing about failing students in general, Peelo (1994, p. 10) said:

‘Students are usually shaped by expectations of a mechanistic approach to study in spite of the distress work problems may have caused – everyone else seems to have cracked the codes, hence worries and doubts about abilities.’

And

‘Pressure to avoid being found out triggers blocks of many varieties, and obliges students to work to unrealistically high standards. And returning to formal education can stir up a mass of dimly remembered anxieties’

The skills involved in HE study include the capture, organisation or storage, and recall of material from lectures, seminar discussions and workshops, books and the internet.

Dyslexic weaknesses in working memory and processing speed, which includes an element of sequencing, impact on many of these academic tasks; they are difficulties seen in 80% of dyslexics (Grant, 2005 p. 36). In addition, there are the organisational and management skills of self-directed study, namely prioritising deadlines and integrating multiple sources. These are also affected by memory problems, as to be selective and able to prioritise one needs to be able to hold the options in working memory (Grant, 2005).

Spelling difficulties, which increase under pressure, seem to be the most intractable problem to the adult dyslexic in university (McLoughlin *et al.*, 1994). Issues with reading speed and absorbing information also linger. The mechanics of reading have usually been mastered before entering HE, but certain situations can still cause problems (Gilroy and Miles, 1996; Du Pré *et al.*, 2008). These include any form of time pressure, the possibility of being asked to read aloud, and complex texts, especially those that include long sentences. The problems often include slow reading, misreading, and difficulties in tracking in dense paragraphs of text.

Writing issues include legibility of notes, spelling or omission of words, and memory retention of an idea until it is on paper (Du Pré *et al.*, 2008). Spelling problems also have effect here, as they hinder research, finding references, interrupt the flow of ideas or the phrasing of sentences, and the recognition of the correct word on a spell checker.

Mispronunciation can underlie some spelling problems (Gilroy and Miles, 1996; Du Pré *et al.*, 2008). Written work in HE is rarely simple copying, but requires instead the ability to recognise key points and summarise, with a view to creating a meaningful structure. Riddick *et al.* (1997) report the written work of dyslexic students often under-represents ability. Layout and presentation often depend on an overview and sense of structure. For some students clear presentation is essential for absorbing information (Bradford, n.d. a and b; Chaparro, n.d; Paradox of White Space, 2007).

Other problems include the use of mathematics, as most students will have to tackle some maths calculations, even if they only relate to how long to spend on an exam question, reading tables and charts as part of their course or understanding timetables for buses and exams (Gilroy and Miles, 1996; Du Pré *et al.*, 2008). Naming and label recall problems can also lead to difficulty when taking part in fast moving discussions, or cause embarrassment at forgetting a person's name. Difficulties with these skills have implications for both academic and social life in HE.

Time is a source of difficulty for dyslexics in a variety of ways. Tasks generally take longer. Concentration often lasts for shorter amounts of time than might be expected (Gilroy and Miles, 1996; Du Pré *et al.*, 2008). Some dyslexics appear to have no sense of the passage of time or the current time of day, week, or month. A lack of sense of time has implications for handling deadlines and keeping appointments (McLoughlin *et al.*, 2002). Many students work better at certain times of day, and this self-awareness is doubly important for dyslexics who cannot afford to waste this optimum period on trivial tasks (Gilroy and Miles, 1996; Du Pré *et al.*, 2008).

The concept of 'good days' and 'bad days' is familiar to most dyslexics and reflects the variability of dyslexia due to stress (McLoughlin *et al.*, 2002). It is highly likely that a new situation such as entering HE will be stressful. High stress leads to 'bad days', which bring back problems in spelling and also reading, and these in turn create a higher level of stress as the student perceives him or herself as 'going backwards'. As Gilroy and Miles (1996, p. 5) note:

'...on a bad day things may simply "go blank", and tutors ... too easily assume that the student is either very lazy or of very limited ability'

The unpredictability of dyslexia can lead to excessive perfectionism to compensate (Gilroy, 1995 p. 62), resulting in yet slower processing, reading or writing (Centre for

Learning and Teaching, n.d.). In terms of reading, compensating can lead to re-reading passages until familiar enough to process the contents or to correctly track through the text so as to make sense of it. With writing, the problems manifest as issues with 'catching' ideas quickly enough and in adequate detail before they get lost or scrambled with the next one. Another aspect is that the lack of automaticity in spelling distracts from attention to the phrase or continuity. There can be a time consuming tendency to try to recapture that 'perfect' phrase that you had, but which has now eluded you. Ultimately, this attempt at recall may not be worth the time and effort.

Coping strategies

Cowen (1988) referred to three types of coping strategies: those that by-pass a skill deficit, those that compensate, and those that remediate the skill in question. 'Learning disabilities' (LD) students is an American term which includes dyslexic students. Cowen built on a thesis (Goldberg, 1983) that showed that the coping strategies of LD students included using university support, careful course selection to play to strengths, taking more time, and applying more effort. Cowen's own work showed that coping strategies adopted from 'remedial and tutorial services' included time management, workload management, high attendance of classes, and conscientious completion of assignments. Personal coping strategies for reading included 'reading in a non-distracting environment, sub-vocalizing, or purchasing previously highlighted textbooks' (Cowen, 1988 p. 164) which proved adequate for assignments but not so reliable for the time pressure of exams. Strategies for written tasks, at that time, included using dictionaries, word substitution and finally relying on others to proofread. Riddick *et al.* (1999) refer to Barga (1996) on negative coping strategies that involved 'covering up or avoiding difficulties'; these caused increases in anxiety.

Choice of course based on selecting a practical hands-on element or lower literacy demands form the highest level of coping strategy. However, Riddick *et al.* (1997) found six of 16 students made their course choice with total disregard to dyslexic difficulties, specifically choosing a course with high text contents. Strategies to compensate for dyslexia often address memory and organisational issues, and may involve the use of photocopies and colour (Singleton *et al.*, 1999) to handle text. In terms of reading skills strategies, they involve the use of technology, scanners, software, and speech recorders, to avoid excessive reading. A 'study buddy' or support network gives the opportunity to

learn by discussing material, comparing notes and social revision (Singleton *et al.*, 1999 p. 34).

Control of environment is another major strategy. Factors such as lighting, temperature, and ventilation can facilitate learning (see *Table 2.2*); Cottrell (1999) lists these in sections on 'Settling down to study' and 'Organising space for study'. For some sound is a distraction while for others listening to music can help an effective level of concentration to be maintained (Hallam *et al.*, 2002). Reid (2005) discussed the presence of windows in a classroom. A window can offer stimulation, natural light and fresh air, or a visual and auditory distraction. For others the settings of a computer system can form an essential element of the personalised micro study environment, allowing for choice of things such as: font; size and colour of font; sound effects; document templates; automatic saving of work; window colour settings; personalised spell checkers; auto-corrects; and use of specialist software.

A great aid to developing coping strategies for a 'new' dyslexic is feedback from the assessment procedure. This helps focus on areas of greatest weakness, but also highlights strengths to be used. The nature of dyslexic difficulties can often make it hard to determine whether strategies are working well, and constructive external feedback is therefore very important.

Individuals may drop back a stage in new situations, as described in McLoughlin *et al.*'s (1994) model of levels of compensation. A highly compensated dyslexic can revert to level two; i.e. being aware of the basic dyslexia, but not understanding the relationship between the problems faced, or how to compensate (Stacey, 2004).

Palfreman-Kay (2001, p. 214 – Support) has indicated that on-going support is not always required:

'...a small minority of respondents felt that they did not require specialist learning support ... one account noted: "There is learning support at university, as yet I have not called upon it. But I am thinking of looking into it this year. My marks so far have been excellent, but it has probably taken me a lot longer to produce the work"'

Areas of study

A comparison of the fields studied at HE by students with no reported disability and the dyslexic population, in 1995/96, appeared in Richardson and Wydell (2003) (see *Appendix*

2.4). Richardson and Wydell reported significant differences in the areas of study ($X^2 = 1380.98$; d.f. = 18; $P < 0.001$). In particular, dyslexics were less likely to study veterinary science, languages, law, education, or medical related courses. The greatest numbers of dyslexic students studied agriculture, creative arts and design, and then engineering and technology, and finally architecture, building and planning while other areas of study included physical sciences, humanities, social studies, biological sciences and computer science (see App. 2.11 for Figure 2. 3 x-axis subject details).

James (2003) reviewed the proportions of the dyslexic student population within a subject area. Dyslexic undergraduates were found in creative arts and design (5.6%) followed closely by agriculture and related subjects (5.2%); others included engineering and technology, architecture, and physical sciences (see Figure 2. 3). The bias was towards more practically based subjects.

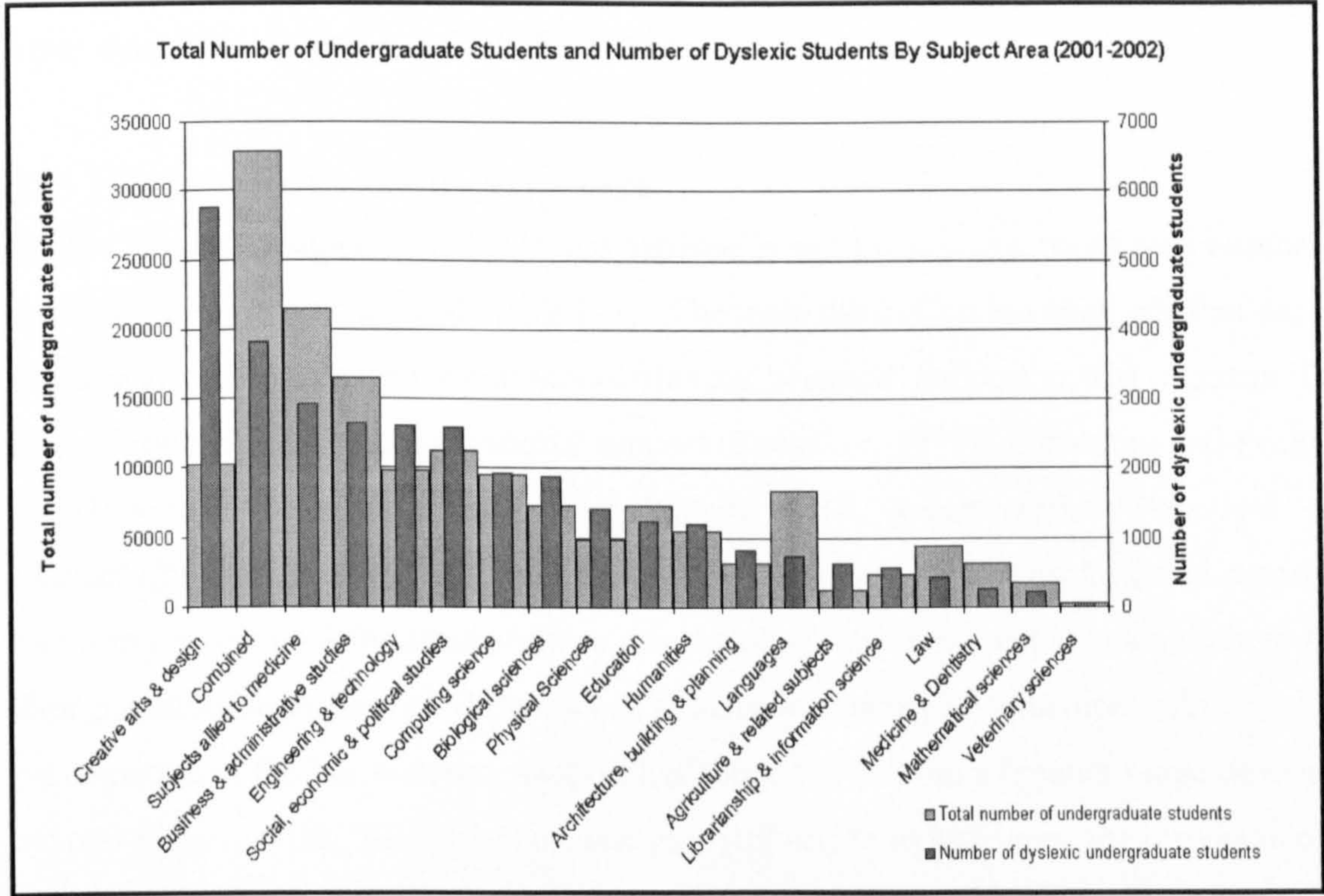


Figure 2. 3 Subject Area Total, by Dyslexic Undergraduates 2000/01 [James, 2003]

Note: The scale for the dyslexic figures is on the right hand side

The second approach was to look for fields where dyslexics formed the largest percentage of the total student population studying it. According to James (2003) courses in ‘Design Studies’, ‘Computer Science’ and ‘Nursing’ had the highest proportion of dyslexic students (5.9%). This latter is of interest as dyslexic students were not particularly likely to be on medical or medicine related courses according to the HESA data used by Richardson and Wydell (2003).

Outcomes

The *Dyslexia in Higher Education* report (Singleton *et al.*, 1999 p. 20) looked at data for 1997 from three universities (see *Table 2. 4* for combined results). A degree class of First or Upper Second was considered a ‘good degree’. The report concluded there was evidence for improvement in the results where ‘appropriate support provision was available’.

	First	Upper Second	Lower Second	Third / Pass	Unclassified	Total
Number	7	38	40	5	7	97
Percent	7.22	39.17	41.24	5.15	7.22	100

Table 2. 4 Degree class results of dyslexic students from three UK universities, 1997 [*Dyslexia in Higher Education, 1999*]

Pumfrey (2001) showed that dyslexic students graduating in both 1997 and 1999 achieved a significantly lower number of ‘good degrees’ and that this was also lower than for many other disabilities (see *Figure 5. 26* for 1995/96 HESA data).

2.3 Higher Education Support

Higher Education support in the UK has evolved in several formats, based on a number of features (see *Section 1.2.2* and *Table 1. 1*). The main distinction has been whether support is being given through the tutorial model offering ‘amateur’ support as part of pastoral care or the service model with professional support (Earwaker, 1992). Earwaker, and Peelo (1994) were key texts on the role of study support in HE. Recent work by Price and Skinner (2007) reflects the shift over the past twenty years towards professional support. Not every student has the same abilities, but the objective of support is to aid them to fulfil their potential, regardless of ‘differences’, to achieve equality of ‘outcome’. As participation in HE has widened, support has needed to address a broader range of issues, beyond literacy skills. The issues include physical access to buildings, the provision of equipment and other tools, and cognitive access to lecture contents for optimal recall. The main issue is how to achieve what was popularly called a ‘level playing field’.

The role of support in HE is seen in a number of different ways around the world, as pastoral care is not always part of a university’s duties (Earwaker, 1992). In the UK in the 1980’s and 1990’s much of the initial motivation to detect and deal with dyslexic issues in HE came from tutors with a personal interest and experience, but not professional training, in support. Support at this time was often seen as pastoral guidance for students who needed ‘extra’ help to get through university, covering financial, personal, disability,

accommodation, and also study issues. One support approach was to 'protect' the student from the university experience and demands by offering concessions and dispensations. Another approach was to facilitate the achievement of potential with reasonable adjustment in terms of access, media used, testing, and competencies.

An institution's ethos dictates strategic decisions about support based on its perceived purpose, mode of delivery and source. Earwaker (1992) showed that, where given, the purpose of support could be seen as a preventative or 'cure' of poor performance. A reactive strategy, one which responds to events, runs the risk that demanding students will get more than their 'share' of a finite resource, while 'coping', pathologically independent or shy students, and those dissatisfied with the provision, would rarely access support. Alternatively, an institution could choose to be pro-active, taking the initiative with support by anticipating needs and making the first approach. Work by Bloy and Pillai (2003) was used with students to facilitate help-seeking at De Montfort University and presented by Pillai at the conference there (2003). Discussion about group work on the ADSHE news group (2007), suggested it might be especially important to students who were not recognised as dyslexic or supported during compulsory education (first years, some mature students and newly recognised).

Another issue is whether support is seen as being integral to the course of study or independent of it (University of South Carolina, 2002; Hobsons, n.d.), and this is affected by the source of the provision as well as its perceived purpose. Some universities attempt to separate learning support from other aspects of student study. In other institutions 'learning support is an intrinsic part of teaching' (Herrington, 2001, p. 172). This latter, more inclusive view means the teaching and assessment methods may need to change to accommodate the learning needs of students. It has the additional advantage that staff teaching the courses can offer a more detailed, but potentially narrower, view of the academic conventions to be followed. Contact time with teaching staff has been progressively cut in recent years, but the need for study advice universally increases (Brown, 2002). Independent support has the advantage of preventing students without difficulties feeling that students with some kind of disability have an unfair advantage in being able to access teaching staff for specific support. Extra-curricular support also allows students to express problems with teaching style, as it is outside the department, not directly feeding back to their course (Earwaker, 1992). Some students express concern that dyslexia support will appear on their degree certificate, and in the RI where this

research was undertaken, leaflets were issued stating that this was not the case (Stacey, 1998).

A difference exists between the demands of school learning and university study. The skills needed are not static and the ability to adjust to new challenges is something to be actively developed. An institution interested in success rates and retention figures needs to focus on these skills. The goal of widening participation has caused a further change, i.e. the increase in pre-degree, foundation courses in the UK, which aim to bring everyone to a similar academic base line. In these courses, it has become common to include study skills for various student groups, such as science and international students. These explicitly address the academic requirements of degree study (University of South Carolina, 2002; Hobson, n.d.). These strategies place study skills firmly inside the curriculum for a number of students.

Lea and Street (2000, pp. 33-4) have taken a detailed look at the way support can help improve poor performance in terms of academic writing. They have identified three interpretations of the role of support, where 'each model successively encapsulates those before' it: firstly, cure or correction of a skill deficit; secondly, introducing the institutions' culture of study, ensuring conformity and successful communication of information by strategic understanding of the tasks; finally, negotiating use of differing practices of communication and 'identity' (including third person passive) to suit various academic contexts and settings, where writing is a way of 'meaning-making' and meaning is debated. This model goes beyond prevention to personal development of study skills.

Good study practices are very important to students in careers with on-going professional development. A culture is needed where, rather than the lack of study skills on arrival being seen as a deficit that should have already been corrected, the development of study skills is part of the essential transferable skills to be developed by all students during their degree study. The objectives of learning support include encouraging students to take responsibility for their own active learning with the aim of achieving their full academic potential.

2.3.1 Dyslexia Support and a Level Playing Field

'The problem with negative experiences is not only that students fail to progress but that they may not seek help at a later date as a result.'

(Palfreman-Kay, 2001 p. 213)

There have been few follow-up studies on the impact of support for dyslexia in school, but what there is includes a study by Klassen (2001) which considered reading support and found that the progress achieved was not satisfactory. The data suggested that only 13% of pupils were making progress on catching up with their peers (Klassen, 2001 pp. 130-1).

Some 'compensated dyslexic' achieve average work by taking time and applying vast effort, and it would be unfair (Sanderson, 2000) if support was then considered unnecessary regardless of potential. Implicit in the objective of facilitating students with cognitive and physical differences is the premise that other students have what they need to fulfil their own academic potential. If this is not the case, successful support is positive-discrimination.

Herrington (2001, p. 190), working in a generic learning support department, observes that:

'... there is a general tendency among dyslexic students to assume that literacy is far easier for students who are not dyslexic than is in fact the case.'

Herrington makes the point that dyslexic students always aspire to equality with their most able peers. Their perception, she suggests, is that it is only the fact that assessments are literacy-based that 'prevents them from taking their rightful intellectual place in the group' Herrington (2001, p. 190).

Farmer *et al.* (2002, pp. 112-6) reported that where support was accessed, the feedback was very positive, but part-time students or those on satellite campuses or franchised courses were more likely to be dissatisfied. In HEIs where support is not seen as detrimental to full graduate status (See 2.4.3 – Graduateness), there can still be ill feeling about the use of support, and this is potentially increased by reduced contact time with teaching staff for all students. Reputedly, staff and students alike find arrangements for a 'succeeding' dyslexic student harder to tolerate, although the student might not actually reaching their potential without support. Palfreman-Kay reported that:

'...some students resented the additional support that I received; this was based on the assumption that the additional support that I was receiving was providing me with an advantage.'

(Palfreman-Kay, 2001 p. 213)

For dyslexics the key to success often proves to be the amount of 'hidden' work, time, and effort going on behind the scenes. Support tends to reduce this or at least make it more efficient, increasing the likelihood of completing the course. Overall, students avoid disclosing to their cohort how much effort is involved. All students need to be convinced

that ‘working steadily is not a sign of stupidity’ (Peelo, 1994 p. 14). If there were a more open acknowledgement of effort, it would make the case for support clearer.

Herrington (2001, p. 191) indicated the range of improvements reported by supported students:

‘Students find the [support] approach described here interesting and they regularly mention outcomes in terms of enhanced literacy and learning and increases in marks, and a growth in general confidence and self-advocacy skills’

She found that a cause for concern amongst the main cohort occurred when the number of supported students reached a ‘critical’ mass and became noticeable.

Farmer *et al.* (2002, pp. 101-12) looked at coping strategies, and found that using specific study skills was the most effective strategy reported at both universities in their study. At one university, the strategy of avoiding difficult courses or modules was reported. Coping by use of equipment and or computers occurred in both institutions, more so in ‘Southside’ at 26%.

2.4 Government Legislation Relating to Higher Education

Changes of Government policy and funding for various aspects of HE has affected the number and needs of students (see *Section 1.2.1*). The policies have raised the question of what it means to be a graduate.

2.4.1 Dyslexia Population in HE

The detailed characteristics of the dyslexic population in HE might vary from those of children in compulsory education, due to the level of difficulties, personality, and academic motivation influencing the decision to enter HE.

Some HESA data on HE students has been available on-line since 1994/95. The Higher Education Funding Council for England started to collect and publish data, including a disability performance indicator, from 1999/2000 (December 2000) continuing until 2003, when HESA took that over. In 1995/96 the national number of first-year students was 574,973 and the total number of students in all HEI’s within the UK was 1,523,748 according to HESA Institution data. For known dyslexics, the first-year total was 3,170 and the HE total for all years had reached 7,014 (Richardson and Wydell, 2003). The HESA data demonstrated that this dyslexic population was growing (see *Section 5.1.1*).

By the academic year 2000/01 there were 10,430 first-year dyslexic students forming part of a dyslexic population of 26,490, in an HE population of 1,759,755 [HESA].

2.4.2 Disabled Students Allowances (DSA)

The DSA is available to UK students and those with residence status with recognised disabilities. The majority of support for dyslexic students within university has arisen from the 1992 Disabled Students Allowances (DSA) for undergraduate courses. The DSA is intended to bolster the student’s resources to allow adequate functioning within the existing ‘normal’ situation. Initially it was only available to students on full-time recognised courses and was subject to means testing (see *Table 2.5*).

The number of disabled students' allowances made by local education authorities In England and Wales as part of mandatory awards in the academic years 1992/93 to 1996/97 Academic year	Number of awards
1992/93	2,490
1993/94	4,050
1994/95	5,320
1995/96	6,550
1996/97	8,120

Table 2. 5 Initial DSA numbers 1992/93 - 1996/97 (Hansard, 1998)

The DSA has since evolved to cover students on an increasing number of courses and in a wider range of circumstances. The following changes (see *Table 2. 6*) are factors that should be considered when looking at the usage figures.

DSA Recommendation	Implementation
Removal of the means test	Sept 1998
Part-time students to be eligible	from Sept 2000
Post-graduate students included	from Sept 2000

Table 2. 6 DSA amendments

The subsequent centralised premium funding for universities, directly funded from the Government, is based on HESA disability returns. The centralised approach reflects the social model by encouraging course and institution level improvements in accessibility.

At the end of 2002 Skill (National Bureau for Students with Disabilities) reported 1.4% of full-time undergraduates had applied for DSA, using data for 1999/2000 and 2000/01 from HEFCE (Waters, 2002). This was lower than previous estimates. The figures may not accurately reflect the number of disabled students in HE, because not all disabled students are eligible for the DSA, and it is not compulsory for students to inform their institution of receipt of DSA. Concern has been expressed that these figures might not relate to the numbers disclosing disability on their UCAS application, suggesting that ‘unseen’

disabilities were failing to apply for DSA (Waters, 2002). Subsequently this data was produced by HESA.

In 2004 Garner (paragraph 2) quoted Harrison-Jennings of the Association of Educational Psychologists:

‘Universities are not centres of altruism. They want to get more students on the roll and more course fees. And the dispensations with dyslexia help them to increase their pass rates in exams.’

The point raised was that potentially an Educational Psychologist employed by the institution was in a position to ‘find’ more dyslexic students, thereby improving the institution’s performance. The rebuttal was that a psychologist employed by the LEA had an economic interest in keeping the numbers down. Those registered as disabled, on Foundation courses or part of widening participation, contribute to the figures used for distribution of centralized funding.

2.4.3 Graduateness

Widening participation has led to concerns about academic standards, and this has given rise to the concept of ‘graduateness’. Graduateness is taken to mean the qualities expected of a successful ‘high’ class graduate, including the ability to structure an argument and debate a point rather than simply acquire a body of knowledge. It reflects working at Lea and Street’s (2000) top-level model of academic performance, which they call ‘academic literacies’. The on-going debate is about the extent to which limitations in literacy skills and their effect on communication of ideas, plus the subsequent support, should infringe upon awards which should be based on the ability to absorb, and process information.

Peelo (1994, p. 12) refers to ‘myths and assumptions’ about ability and the significance of support. The main being:

‘able students already know all they need to about study, so to have problems or to examine how you study is, of itself, a sign of lack of ability ... a sign of ... lowered standards’

She observed that even:

‘Talking about ‘skills’ raises strong emotions in those who see all academic teaching as fostering innate intelligence’.

Peelo (1994, p. 12)

Singleton *et al.* (1999, p. 18) showed that the government view of graduateness also covered:

‘...ancillary qualities ... such things as the ability to write in grammatically acceptable and correctly spelt English (or Welsh), a certain level of numeracy, a range of general knowledge, a basic familiarity with information technology’.

The report highlighted the fact that this target for gradueness would exclude many dyslexic people from HE, which would be in direct conflict with widening participation.

The goal of widening participation and the provision of support can exacerbate concerns amongst the main student cohort about the numbers of students being supported and the implication for the status of their own awards (Tresman, 2004; Jamieson, 2004). The role of university has traditionally been associated with developing recognised ability and not detecting the innate. Support has therefore often been seen as a crutch offered to people 'not quite making the grade', perhaps even a tool used by institutions to improve their results, or to hide the fact they did not attract top students. Hence, provision of support might lead to a lowering of standards, and there is a risk of discrediting support for cognitive differences. If intervention formed part of the curriculum for everyone, who wanted it, and was aimed at developing desirable course outcomes such as transferable skills, the probability is that support would not be resented.

2.5 The Case-study Institution and Its Practices

Dyslexia support was introduced into the case-study HEI under the blanket cover of Disability Support in 1992 (Stacey, 1992) when the institution became a 'new university' and some students were able to access the new DSA. Support was provided by Student Services Dyslexia Support team combined with external specialist tutors (see *Section 1.2.3*).

The dyslexia assessment report for registration normally had to be less than two years old, completed by an Educational Psychologist, and to use adult tests (Stacey, 1998). A current assessment and DSA funding did not have to be in place for support to begin. Group study skills sessions were available before these stages of formal registration were complete.

2.5.1 Support on Offer

Students could access the Group sessions while their dyslexia was officially unconfirmed, otherwise support provided by the university depended on dyslexia being documented in such a way as to meet the registration requirements. Study support included information about dyslexia-aware marking and exam arrangements managed by the university, and provision of lecture handouts in advance or in a computer format recommended in Needs Reports; the student had to negotiate with individual lecturers for the handouts. Support tuition was considered in terms of individual one-to-one tuition, group sessions and maths

related support. Individual support sessions could be arranged and paid for privately if the DSA was not in place.

How easy support was to access depended on the student’s main study campus at the RI. As part of the Counselling and Advisory arm of Student Services, the office was initially on the central teaching campus, then on an adjacent administration and social campus. Based in the Student Union, the office was accessible without the reason being conspicuous.

The help on offer changed and increased during the period under review, and came in two parts: firstly help in applying for funding, and secondly, help by providing or organising support (see *Table 2.7*). The key study skills addressed by support included: all relevant forms of note-taking; reading, including proof-reading strategies for your own work; interpreting questions; planning and structuring written work; revision strategies and exam techniques. Typing skills and stress management techniques were sometimes offered. Some of these involved the use of technology and specialist software.

On Offer	Support with :	Available
Induction week Workshops / drop-ins	Administration	1995 - current
Assistance applying for DSA	Administration	1992 - current
Staff training	Awareness	1992 - current
Standards for Dyslexia assessments - introduced	Support	1994
Dyslexia screening (BDA checklist, and trials of DAST and LADS)	Awareness / Support	BDA – DAST – LADS –
Financial aid for assessments	Support / Administration	2000
Exam time concessions, expanding to include use of computers.	Support	1992 - current
Note-takers / Scribes for exams	Support / Administration	current
Readers / recorded exam questions	Support / Administration	current
Printing, photocopying and library arrangements.		1994 - current
Standards for Dyslexia assessments - revised	Support	1999
Organising Formal Needs assessments appointments	Administration / Support (became generally compulsory, to guide spending of DSA)	1995 - current
Contacts for 1-to-1 support tutors with dyslexia support skills	Support	1992 -current
Group study skills sessions	Support	1995 - 2003/4
Learning Skills Module	Support	1995 -2000 + 2002/03
Colour sensitivity screening	Support	1998 - 2002/03
Photo-reading skills	Support	2000 - 2004
NLP – Neuro linguistic programming	Support	Occasional
Brain Gym	Support	Occasional
Internal support Tutor(s)	Support	2003 - current
Internal support Tutors – not specifically for dyslexic student	Upgrade	2005 - current

Table 2. 7 Dyslexia Support offered by Student Services

The Learning Skills module for students with dyslexia was accredited as a basic module for many degrees for a decade. Students with intensive placement timetables and course-dictated module lists have found it difficult to incorporate this module into their degrees. However, not all courses accepted Learning Skills as a basic module and reductions in the number of modules permitted as part of a degree contributed to the drop in the number of students taking it. The module has now been discontinued, due to staff changes.

In the last decade, study skills have ceased to be seen solely as an extra-curricular activity. Modules in this area have become integral to various foundation courses and the timetables of many international students.

2.6 Conclusions from the Literature

Government policy is specifically directed at diversifying and increasing the HE student population. This emphasizes the need to clarify the part support will play in the life of all HE students, and in particular dyslexic students who form the focus of this research.

Dyslexia is thought to arise from a genetic pre-disposition. To be successful, especially in transfer to HE, awareness and acceptance of difficulties underlies the development of successful strategies and self-awareness of good meta-cognitive skills (Riddick *et al.*, 1997; McLoughlin *et al.*, 1994). Research is still needed to determine whether dyslexic students have developed these skills, and whether there is a relationship between this, and recognition and support at school.

Since initial attempts to use Wechsler IQ tests to create cognitive profiles (ACID) had been discredited, WAIS-III indices with literacy scores and personal history have been found effective. The literature relating to the first key research aim, i.e. determining the demographic nature of the HE dyslexic population (see *Section 2.4.1*), revealed a number of issues which led to a refinement of the focus of the research. The main task was to look for characteristics and possible sub-groups of the dyslexic population in the case study HEI. There is still a desire to find whether there are valid ways of grouping dyslexic students. The literature search made it clear that the aspects of dyslexia that could contribute to identifying a support-needs profile include: the stage at which dyslexia was identified; the 'severity' of dyslexia; the access to previous support; and existing coping strategies. Research showed that late identification would be expected to have long-term impacts upon self-confidence and academic outcomes. Also of interest: the way in which

students understand failure, the factors to which they attribute it and its impact upon self-confidence. One of the main points to arise was the importance of gender, as some research showed that this may have a significant impact on personality development as a result of experiences and also affect the responses to adversity and stress. There is also evidence that there are differences in expectation between the genders, and indications of delays in identification of female dyslexic students, in particular.

As for the second aim (to investigate the actions and experiences of the dyslexia population in the RI and outline any implications for practice) literature on the perceived role of support provision in HEIs indicated a conflict between attempts to ‘fix’ the person or amend the learning situation. The policy adopted on this had great implications for the students’ need to register for support, as it affected the type, location, and amount of support available within the course, which could be accessed without registering with the support team.

The literature encouraged a belief in the benefits of some knowledge of learning styles, with a view to developing meta-cognitive skills. This called for an investigation into the impact of support, and required a better understanding of whether use of preferred learning modes was a natural progression from multi-sensory teaching of dyslexic students. It was also clear that the motivation for studying in HE and the approach to goal setting, combined with past learning experiences, could affect the experience of studying in HE and the final outcome.

2.6.1 Research Questions

Five research questions (RQ) arose from the literature review, which could be grouped into the two aims (see *Section 1.3*):

First aim: Determine the nature, demographic and characteristic, of the HE dyslexic population, nationally and within the RI, with a view to identifying potential sub-groups

RQ1: What was a representative sample of students with dyslexia within the university population, based on gender, age and field, considering data for both the national situation and the case study institution (see *Chapter 5*)?

RQ2: What characteristics offered the best means of defining and recognising various dyslexic profiles, preferences and approaches to study (see *Chapters 5, 6 and 8*)?

The rationale for addressing the issue of a representative sample in the first research question, rather than treating it as a methodological issue, was the need to investigate the context, at a national level, for the historic data and subsequent individual data from the RI. This offered a quantitative context for later qualitative detail.

Second aim: Examine the actions and experiences of the dyslexia student population before and during their time at the RI and implications for support practice

RQ3: What were the factors influencing the approach to registering for support, and using it. What was the impact of support on students (see *Chapter 7* and *8*)?

RQ4: How was the experience of studying at the RI influenced by the approach to learning adopted, and what was the influence of previous learning experiences (see *Chapters 7* and *8*)?

RQ5: Did dyslexia and experience of support (based on self-report) impact on the outcomes and course results for these HE students (see *Chapters 7* and *8*)?

The next chapter looks at the theory underpinning the design used to achieve these aims, and the measures used to investigate these questions.

Chapter 3 – Methodology

3.1 Introduction – Rationale for Chosen Methodology

Wellington (2000) and Pring (2000) were consulted for a wider understanding of research methods and issues, subsequently the detailed approach to methodology was driven by the stages and lists of Cohen *et al.*, (2000). Adopting a single system of phrases and terms gave a consistent, logical framework for the research.

The aims of this study indicated the need for a design with some quantitative data for generalization but also some qualitative information to look at students' previous learning experiences. The methodology addresses underlying research and education theory and the decisions, which were made about design the collection of data. Ethical and data protection issues had to be taken into account. Choices were then made to facilitate data collection, covering the chosen measures. Chapter 4 looks at the sampling, actual methods, and procedures, which were used, while the tools used can be located in the Appendices. The details of the sample and findings can be found in Chapters 5-8.

3.1.1 The Focus

As this was a project with a single researcher, action was required to reduce research bias; 'knowing' should take into account the knower's own value position (Cohen *et al.*, 2000). Therefore, I had to state explicitly my own experiences and beliefs here, which would be brought to bear on the data when describing and categorising the students' accounts of their experiences. As a dyslexic person and student, also working within the dyslexia support provision of the RI, my stance was that of an 'insider'. This would have an effect on my observations and my interpretation, while also at times giving a deeper insight into the issues students face. Students were made aware of my dyslexia in the Permission document (see *Appendix 3.4 b.1*).

A major motivation in undertaking this project was that, since the widening of participation in HE, a better knowledge of the support experience and its impact on results was considered necessary in order to plan future provision. According to the literature available at the start of this thesis, there had been no previous research into the effectiveness or appropriateness of the support provisions available for dyslexic students at university (see *Chapter 2*). This had changed by the completion of the research (Herrington, 2001; Farmer *et al.*, 2002). The objective of the whole project was to review

support provision and usage in the hope that a few influencing factors would be identified (see *Section 2.6.1* for research questions).

3.2 Research Theory

Within the field of Education Studies it is necessary to position research in terms of method and design (Cohen *et al.*, 2000; Wellington, 2000). The choices of design, methodology, and subsequent tools in this study were influenced by the stance on key philosophical issues (see *App. 3.1*).

3.2.1 Approach Influences

The philosophical issues that can influence the choice of design approach are covered by the theories of Positivism, and Interpretivism. These two paradigms underlie basic research methodology decisions, and in turn have a significant impact on design choices because they have differing perceptions of social science. This made it necessary to clarify where this research ‘sat’; i.e. between the supposed objectivity of a Positivistic or Normative approach (seen as ‘scientific’), and the subjectivity of Interpretivism, looking at experiences of individuals (Cohen *et al.*, 2000 p. 181).

Positivism seeks hard, quantitative information which is replicable, objective and value-free, from which to make generalisations (Wellington, 2000). It was seen as the exclusive user of quantitative methods. Moreover, within this framework, for data to be considered valid, it must be observable with identifiable causes.

In contrast, Interpretivism takes knowledge as being socially constructed; all views are considered valid including the unobservable ideas (within the mind). This naturalistic stance aims to understand the subjective world of human experience by using qualitative methods and tools.

Key areas of difference between these two paradigms relate to: belief in the presence or absence of underlying rules; the idea that behaviour is a response to stimuli driven by causes in the past, compared to seeing it as intentional with a view to the future; the existence of universal or general theories which research validates, rather than considering theory to arise from the research context (Cohen *et al.*, 2000). As a result, the type of method appropriate to each paradigm is different. The relationship between the paradigms,

design assumptions and the use of quantitative tools (surveys and experiments) versus qualitative methods (accounts and participant observation) can be seen in *App. 3.1*.

Within Anti-positivism / Interpretivism there are a number of approaches, including Phenomenology, Ethnomethodology, and Symbolic Interactionism, that could have been adopted for the research (Cohen *et al.*, 2000). In particular, Phenomenology studies the direct experience of the world by a person and Phenomenography goes further by looking at a second-order perspective, i.e. how the individual conceives their world (see *Appendix 3.1*).

The main proponents of Phenomenography, Marton and Booth (1997), were looking for a qualitatively different, but finite number of categories in an outcome space. The number is not fixed and can be changed by new discoveries. Such an approach would suit the search for factors in the phenomenon of support-usage. To have a number of aspects and for interviews to cover multiple topics or aspects would be acceptable and result in an 'outcome space' for each one.

The Interpretivist approach works from the bottom-up, by the investigation of data gathered from subjects within their 'natural setting', which in this case would be students at university. The 'truth' extracted from the data is inevitably bound to the research context by the very nature of the approach adopted. This was appropriate for this research, because so little was known about the factors that govern behaviour or actions in relation to support usage. Thus, beginning with individuals and understanding their interpretation of the world held out the possibility that the results would offer useful, well informed opinion 'grounded' in data.

3.2.2 Design Issues

For this research, it was necessary to look for approaches that allowed the inclusion of statistical background data, leading to investigation of people's understanding and perception of the phenomenon support-offered-at-university for dyslexic students. This needed to be seen in light of accounts of previous experiences of learning and support. The study was interested in obtaining information directly from the people involved about their experience of study while avoiding external constraints arising from the forms or structure of the research. The aim of the design was to provide sufficient data to establish a case for the interpretations offered and to form the basis for generalisations. In the

absence of existing theories this study required an open approach not constrained by methodology or researcher bias.

A key element of the subjective angle is the concept of dynamic internal constructs held by individuals but influenced by social factors, making multiple perceptions of 'reality' possible amongst a group. This requirement favoured Interpretivism, where findings are relevant at a particular time and in a context. While the objective 'hard science' of the Normative approach was not appropriate for much of this research, access to larger samples and an intention to look for causes and generalizations meant objective methods could not be entirely excluded. The design needed to rest within an Interpretivist framework while accommodating quantitative as well as qualitative methods and tools. As Wellington (2000, p. 17) has pointed out:

'Background statistics, or just a few figures from available records, can set the scene for an in-depth qualitative study'.

The focus on 'subjective experience' led to a phenomenological approach, which underpins one aspect of the methodology; this aims to answer the question: 'How does the person experience her world?' (Marton and Booth, 1997 p. 117). Indeed it went beyond that to the empirical phenomenographic stance, considering:

'What are the critical aspects of ways of experiencing the world that make people able to handle it in more or less efficient ways?' (Marton and Booth, 1997 p. 117).

Education research is often used now to provide the basis for future policy planning, aiming towards a science of effective schooling. This is a swing away from qualitative subjective research, which was favoured a decade ago. Therefore, the design of this project needed to stress the meaningfulness of the research findings to both the academic community and that of the support practitioner. In aiming for rigour, it was hoped that the results would be perceived as having 'worth' – a positivist concept; they would then also have the potential to be generalised beyond the situation in which the research took place. One of the objectives was to provide a basis for future support policy planning, and this goal made a small-scale in-depth interpretive narrative research design unsuitable. The greater the volume of quantitative data gathered by survey, the more generalisations would be possible.

Once the approach and strategic design issues had been addressed, consideration of the relevant aspects of both survey and interview techniques became essential. Some of the

data was intended for subjective review, some for quantitative analysis. A quantitative approach to data-gathering includes counting, obtrusive and controlled measurement (surveys, experiments, case-control studies, statistical records, structured observations, and content analysis). By contrast, qualitative data-gathering uses observing (participant observation), in-depth interviewing, action research, case-studies, life history methods and focus groups.

Questionnaire and question theory

A questionnaire is a survey tool that collects information, often by category (nominal), commonly in number value form (ordinal, ranked, rated) for ease of future analysis in quantitative terms. Questionnaires have a number of strengths and weaknesses (see *Table 3.1*).

Questionnaire – advantages
• Reliability – associated with honesty due to anonymity.
• Costs – time and money.
• Blanketing and large sample contact – mailing.
• Speed to do – complete and score, (subject to question types used).
• Flexibility in terms of time – when participant opts to complete.
•
Questionnaire – disadvantages
• Time to create structured questionnaires - discrete exhaustive categories for closed questions.
• Time to pilot and review.
• After printing / sending there is no chance of amendment.
• Hard to clarify respondents confusion / interpretations – questions / instructions.
• Accommodating aim of equality of access to questions and responses.
• Response rates.
• Visual / concrete evidence of size of task.

Table 3.1 Summary of questionnaire strengths and weaknesses

Although questionnaires are often seen to be a tool from the Positivist school, they are inherently based on the participants’ interpretation of the question. This may not correspond to the intention of the researcher or conform to that of other participants.

In order to be effective, question forms must be suitable for the type of information to be gathered, namely whether they are attitudes, opinions, perceptions, facts, or decisions. There are a number of common forms for presenting questions. The nature of the possible answers offers a variety of response functions, such as flexibility, sensitivity, and differentiation (Cohen *et al.*, 2000 pp. 245-57). The choice may depend on data-processing demands or the depth of information required.

There should be a balance between closed question or scale-based answers, and open-questions which require more input from the participant and cannot be analysed in the

same way. However, open questions may provide the participant with a welcome break from trying to fit responses into categories they would not themselves have chosen.

There are a variety of closed question forms, including dichotomous, multiple choice, ranking and rating scales (Cohen *et al.*, 2000). There are closed question forms that imply an order, such as preference ranking, but also scales depending on semantic meaning – Likert scales, and numeric scales with or without equal distance between points (shoes size, height). Some sensitivity and differentiation of response are built into rating scales. Scales allow some flexibility of response, and can be used to determine frequency and correlation of data for quantitative analysis (Cohen *et al.*, 2000).

Normally when the sample size is large the questionnaire needs to be structured, meaning that it uses closed questions and number scales (Cohen *et al.*, 2000 p. 247). A smaller sample means questions can be more open, even forming part of an interview. The risk with closed questions is that not all categories, nor all researcher expectations, will be covered. Piloting can help identify problems with terminology, scenarios that have been overlooked, and cases where some questions could be by-passed as they do not apply.

It is important that the questions and the response options should not be leading or loaded, while instructions and presentation should be clear. When response categories are offered, they must be discrete. Self-completion questionnaires require extra attention to the use of vocabulary and potential ambiguity (Cohen *et al.*, 2000). Although it is helpful to keep the number of questions down, this should not be at the cost of adding format complexity.

Beyond the issue of question format is the ordering of the questions. The objective of the survey needs to be clear, perhaps moving from the generalised to the specific, whilst the topics need a sense of order e.g. chronological. A good design makes it more likely that the participant will invest time in answering the first few questions, which encourages them to continue and complete. Motivations for completing questionnaires can be altruistic, personal issues to address, or compensation offered for time taken to answer.

Simple and non-threatening or interesting questions that are easily answered form a good start. If the questionnaire is more than one side of paper, the physical location of the question might influence its completion. General personal details can be seen as an easy start and it is a plus point for some people, in public places, that personal information

would be turned out of sight relatively quickly. A deeply personal question as the opener is probably off-putting rather than attention grabbing. Some questions will undoubtedly get a better response as a rapport is established and a sense of 'what the questionnaire is getting at' has formed. In general it is recommended that the middle section contains the difficult questions and tends towards various forms of closed questions (dichotomous, multiple choice, rating scales). Finishing off with 'interesting' open questions looking for attitudes and candid responses helps ensure that the survey is returned, by ending on a good feeling.

Length of a document is a significant issue, in terms of number of sides of paper and the number of questions; if either of these are too great, this can become a reason for not starting, or indeed abandoning a questionnaire due to the time taken. Using flowcharts to structure questionnaires allows the designer to see where participants can be routed round some questions, hence respecting their natural desire to complete it quickly while enhancing the feeling that they are an appropriate participant.

In terms of research it maybe impossible for the participant and researcher to meet, but issues of informed consent need to be addressed. Questionnaires can be administered in a number of ways; namely face-to-face, verbally (including over the phone) and self-completion delivered by post or electronic form.

Interview theory

The structure of an interview positions it on a continuum between informal conversation and a closed question formal interview. A structured interview suggests that the researcher already knows what information is needed, and may even want to compare the data from different interviews in a quantitative manner. By contrast, an informal interview seeks to elicit information to clarify issues, and to obtain unique or personal information about views held.

According to Cohen *et al.*'s (2000) summary of Kvale (1996, p. 14), an interview should be seen as 'an interchange of views between two or more people on a topic of mutual interest'. According to a quote from Laing (1967, p. 53) cited by Cohen *et al.* (2000) an interview consists of knowledge:

'...constructed between participants, generating data ... the interview is not exclusively either subjective or objective, it is intersubjective.'

The strengths and weaknesses of interviews can be seen in *Table 3. 2*.

Interviews - Advantages <ul style="list-style-type: none">• Clarify points.• Adaptable phrasing and pacing – to ensure the question is ‘understood’ in the same way by all respondents.• Probing - depth and follow-up points.• ‘Good rate of return’ – if agree to do it, it usually happens, better motivation.
Interviews - Disadvantages <ul style="list-style-type: none">• Prone to interviewer bias and subjectivity.• Guided approach – phrasing and sequence of questions vary.• Responses hard to compare.• Costs – resources and time.• Loss of anonymity – responding to questionnaires does not guarantee willingness to be interviewed.

Table 3. 2 Summary of Interview strengths and weaknesses (Cohen *et al.*, 2000; Drever, 1995)

It is necessary for a researcher to explicitly state the experiences and beliefs they bring to bear on the data when describing and categorising experience accounts.

‘No matter how hard the interviewer may try to be systematic and objective, the constraints of everyday life will be a part of whatever interpersonal transactions she initiates.’
Cohen *et al.* (2000, p. 268)

An interviewer who is familiar with the area under discussion may be able to put the interviewee at ease. However if they are perceived as an expert, the information provided may be modified to fulfil any expectations the interviewee recognises. This could mask the key experiences of the interviewee (Riddick *et al.*, 1997 p. 159). Autobiographical interviews reflect the self-concept that the interviewee holds and the interpretation of events used to support that concept (Palfreman-Kay, 2001 p. 207).

The stages involved in interviewing can be seen in *Table 3.3*.

1. Identify themes / issues	Kvale (1996, p. 88) according to Cohen <i>et al.</i> (2000)
2. Design	
3. Interviewing	
4. Transcribing	
5. Analysing	
6. Verifying	
7. Reporting	

Table 3. 3 Stages of interview methodology

There are a range of question approaches for interviews, and the choice will be influenced by the nature of the required responses; for example, factual versus opinion. The design choices will be influenced by the need to encourage reflection. Closed direct questions offer limited potential responses, while indirect open questions encourage more exploration of the ideas.

There may be additional tools to use with semi-structured interviews, including a prompt sheet to give structure, consistency and to clarify the process. The prompts can include

probes to extend, expand, or elaborate responses, and to ensure that themes needed for analysis are covered. This can be structured to funnel responses by detail or format of question to get specific information or depth of response.

Due to the amount of interpretation and reflection needed to apply a phenomenographic approach, it is necessary to record the interviews for later analysis. It has been suggested that it is not appropriate to refer to a ‘phenomenographic analysis’ of an interview. Wenestam (phenomenog-1 e-mail group discussion, 2000) advocated that it was better considered as an analysis of data gathered by interview rather than of the interview itself, especially if a recording is used (see *Appendix 3.2*). Indeed analysis of recordings transcribed to text could be considered significantly different proposition to phenomenographic analysis of an interview.

Sample theory

Sampling has a number of steps, (see *Table 3.4*).

- | |
|--|
| <ul style="list-style-type: none">• Definition of population of concern• Specification of a <u>sampling frame</u>, a <u>set</u> of items or events that it is possible to measure• Specification of <u>sampling method</u> for selecting items or events from the frame• Determination of the sample size• Implementation of the sampling plan• Sampling and data collecting• Review of sampling process |
|--|

Table 3. 4 Stages of Sampling

Before gathering data it is necessary to define the population being researched and the selection criteria or sampling method involved. A number of issues affect the choice of a sampling method, such as the size of the total population, the number of research groups or factors to be represented, and the resources available. Sampling strategies can be restricted by the accessibility of the population.

Where the use of inferential statistics is intended, a sample size of 30 is generally held to be a minimum (Cohen *et al.*, 2000 p. 93), although this would increase with the number of variables controlled and the types of statistic used. For questionnaires with a response rate of perhaps 30%, the minimum sample should be close to 100. The other aspect of sample size is the number of cases needed to accurately represent the total research area population. Conversely, subject to the nature of the data to be gathered, there will be a point at which the sample size becomes cumbersome in terms of either entry or analysis.

Once the style of the research has established the required sample, a sampling method can be selected. Sampling can be random in some form, or non-random; i.e. involving some criteria. Some of the research population might fall outside the frame and thereby be unavailable to whichever sampling method is used (see *Section 4.2*).

To ensure a representative range of participants, the sampling strategy needs to avoid excluding part of the population due to access issues, including the media used for publicity and the measures, and the location or timing of data gathering. There has to be awareness that selection criteria are open to researcher bias or access; that the sources and resources available affect the method of sampling used, and that self-selecting samples may not be representative. The responses of self-selecting volunteers might have more to say about their altruistic nature, cooperativeness and conscientiousness than their representativeness of the research population as a whole. Care also needs to be taken to counter the presence of 'habitual' participants in research projects, or those with a personal agenda concerning the research area to ensure that they do not outnumber other sub-groups.

Where an on-going study is undertaken, a drop-out rate needs to be anticipated. Drop-outs have procedural implications for data protection, posing questions such as: can data previously gathered still be used if the participant drops out? How can data be removed if consent is withdrawn? What follow-up is possible and could anything be done to prevent the withdrawal from the study?

3.2.3 Statistics

The design of this project had to include descriptive statistics to look at trends and relationships within the data. These were needed to help define the dyslexic HE population in the research institution (RI), allowing a representative sample to be recognised; this was part of the research objectives (RQ1). Descriptive statistics also permit investigation of outcomes (addressing RQ5) and support use (addressing RQ3). The design also had to incorporate statistics for factor and cluster analysis to address the research question on potential dyslexic profiles (RQ2).

Factor analysis is an exploratory tool. It is used either to reduce the number of variables needed to summarise the data, or to detect structure in the data (Field, 2005, p. 619; Pallant, 2005 pp. 172-3). Both goals applied in this research. Cluster analysis is a further

set of techniques designed to look at ways of grouping cases rather than variables (SPSS - Statistics coach v12, n.d.). Cluster analysis procedures can be used when factors or components have been identified, to see how the cases (people) are grouped based on the means for existing variables.

These analysis procedures attempt to identify relatively homogeneous groups of cases (or variables) based on selected characteristics, using an algorithm that starts with each case (or variable) in a separate cluster and combines clusters until only one is left. Distance or similarity measures are generated by the proximities procedure. Statistics are displayed at each stage to help in the selection of the best solution.

3.2.4 Ethics

Pring (2000) quotes Simons (1995, p. 436) who defines ethics as:

‘... the search for rules of conduct that enable us to operate defensibly in the political contexts in which we have to conduct educational research’.

According to the University Research Rules:

‘The integrity of any research depends not only on its scientific rigour, but also on its ethical adequacy.’ <http://www.brookes.ac.uk/research/ethics/ethicscode.html>

Cohen *et al.* (2000) indicate a number of areas where ethical issues might arise, individually or in combination, when planning research. Not only is the nature of the project a potential concern, but so is its context and the location. During data gathering problems might arise from methods that are covert, procedures that cause anxiety and from the type of data collected, particularly if it is of a sensitive or personal nature. Another ethical point relates to whether the participant group might be deemed vulnerable. Finally, there was the use of the data, including the possibility of its later publication.

The ethical considerations which arose specifically in this research included the impact of prolonged focus on potential difficulties and problems arising from dyslexia; the question of how to motivate participation without infringing financial inducement guidelines, and problems concerning security and confidentiality of data. Confidentiality with reference to dyslexia, and data security as part of data-protection, were considerations.

No matter how a questionnaire is presented, the participant needs to have made an informed consent to complete it, and to the subsequent use of the data, at the same time being aware of the right to withdraw at any stage from the research. A respondent needs to

be assured of the confidentiality and anonymity of the data that is provided (see *Section 4.3.1* – for the procedure adopted).

3.2.5 Data Protection

Data protection issues included the nature of the contact: how the subjects would be invited to participate and give their consent; confidentiality; and data storage. These came under the Data Protection Act (1998) and Human Rights Act (1998), which came into force in 2000.

Key data protection aims of this research included procedures which maintained confidentiality by not allowing the participant to be identified from data or results, and by not gathering sensitive data without adequate prior consent in writing. Dyslexia is ‘sensitive’ information according to the Data Protection Act for which you need explicit, written consent in the shape of a release form. This consent was taken to require: name, student ID, date and signature provided (see *Section 4.3.1*).

3.3 Research Format – Decisions

This research planned to use a significant amount of hard quantitative data as well as interpretative measures, including interviews, as its framework. The design strength lay in the use of two paradigms and a mixed methodology. The methodological decisions were subject to a number of limitations and restrictions: i.e. research constraints; HEI factors; the nature of the sample, and ethics.

The research constraints related to resources and included both time and manpower. This influenced the project at all stages, from the paperwork for mail-shots and the follow-up procedures through to interview transcription and data entry.

The main institutional factors included the number of mature students and the use of a term-based modular instruction system at the RI. These factors meant there were definite times that were considered unsuitable for presenting questionnaires to participants. The nature of the sample and ethical issues dictated decisions about follow-up procedures.

3.3.1 Design and Aims

As a result of considerations of design in Section 3.2.2, it was decided to use interviews and questionnaires to establish past academic experiences, the use of support, and the

criteria for choosing particular modules. Who-Are-You (WAY) statements were used in an attempt to avoid researcher's bias unduly influencing the interpretation of data.

There was a preliminary phase in which focus groups or interviews were considered as a means to identify the issues facing dyslexic students at the RI. In an attempt to avoid contaminating the main subject groups, it was decided to interview a number of final year students as a precursor to question design and piloting (see *Section 4.3.3 – Pilot interviews*). The main design was then based on three phases. The first was the need to look at the historic context of dyslexia in the RI to establish a sample profile (see *Section 4.3.4*). The second two phases involved data collection from current students. The second phase explored the student preferences, experiences, and outcomes (see *Section 4.3.5*). The third was interviews with students, which included exploring their academic history (see *Section 4.3.6*).

As part of the initial phase, the available leavers' data had to be analysed and a standardised format developed that covered the relevant data. This log sheet formed the basis of a coding book for SPSS variables (see *App. 3.2*). SPSS statistics would then be used to describe the population.

The design of the data gathering phase followed a staged approach as the questionnaire respondents fed into a smaller group who completed the personality inventory, some of whom subsequently participated in the interviews (see below and *Section 4.3*).

For Phase Two, the procedural decisions were to contact all dyslexic students known to the institution by many methods: RI newspaper; dyslexia-specific newsletters; posters; flyers; and computer based university log-on messages-of-the-day. It was decided to obtain a signed and dated consent, in relation to this study, for every participant in Phase Two.

Phase Two used a related portfolio of questionnaires. A number of survey tools were used or developed for this. Although the intention was to keep the literacy-based tasks to a minimum, it proved necessary to use a number of tools. Where pre-existing survey tools could be used, it meant that design data was available for a number of measures, in some cases giving proven normalised data, and this permitted comparison with results from this study. Where the themes being addressed were institution-specific, or no appropriate survey existed at the time, questionnaires had to be developed.

It was necessary to find ways to gather information on the students' dyslexia, intellectual strengths, and learning styles. Gender and age group were identified as core data to be gathered across measures and phases. Personality and criteria for choosing modules during a course were likely to be significant factors in learning and study behaviour. The support phenomena needed to be seen in the light of accounts of previous experience of learning and support. The measures are detailed in *Section 3.3.2* below.

Phase Three, the final phase, required a sample of interviewees. The sample was selected from the respondents to the survey, who were prepared to be interviewed. To reduce the tendency of interviews to be given by just the 'willing' and 'organised' volunteers sampling targets were needed. The overall aim of interviewing 17 students from each research group was based on resource limitations (see *Section 4.2.4*). There were two basis for approaching participants for interviews, firstly by aiming to cover the permutations of gender, age group and research group with a minimum of two cases. Secondly to achieve coverage reflecting RI trends seen in the historic data (see *Table 5.5*).

For some students e-mail was identified as the best way to arrange the meetings. To allow for comparisons between interviews, a structured set of prompts was developed, based upon information gained from the pilot sessions and limitations of the selected measures (see *Appendix 4.2*). To allow in depth study of the interviews, it was decided that they would be recorded, and it was anticipated that they would average an hour in length. Recordings would then be transcribed and the themes analysed through the NVivo text analysis package version 1.3 (Richards - QRS International, 2000).

The variables of interest were gender, age group and research group which were categorical. As categorical variables a 5% margin of error is acceptable in educational research (Bartlett *et al.*, 2001). From RI HESA returns it was expected the total dyslexic population known to Student Services for 2001/02 would exceed 600, and for a 95% confidence level with a confidence interval of 5 +/- a minimum sample of 234 was the appropriate design sample size based on Krejcie and Morgan (1970) cited in (Cohen *et al.*, 2000 p. 94 Box 4.1). For a postal a sample increase of 40-50% was recommended by Salkind (1997) cited in Bartlett *et al.* (2001). The constraint of resources, both time and personnel, influenced the structure of the measures used, and modified the research in terms of administration and analysis of the data gathered (Bartlett *et al.*, 2001)

Analysis plans further contributed to determining the design sample. Sample requirements for statistics applied to individual measures and combinations of measures: Correlation according to Borg and Gall (1979, pp.194-5) cited in Cohen *et al.* (2000, p. 93) is to be undertaken with no fewer than 30 cases; Chi-squared testing for independence is suited to 'very small samples' (Pallant, 2005 p. 286); Hierarchical cluster analysis is suitable for samples of less than 200 participants and while K-mean is appropriate for more than 200 (SPSS Statistics coach v12, n.d) and especially for a sample of over 1,000. A sample of over 200 was the target, but this was recognised as a challenge for a response rate to postal questionnaires where 30 percent response might be expected, given the total population expected (see *Section 3.2.2 - Sample theory*).

3.3.2 Materials

Materials, which were used in the three phases of the project – historic data; surveys; interviews – and the associated administration and scoring from data gathering, are detailed in this section. Cream paper was used for the measures and information sheets, for ease of reading, as it has a less harsh contrast with text than white paper. Follow-up paperwork used a number of pastel shades to make it stand out in a predominantly white paper environment, in order to aid location and to attract attention.

The sample population by definition had either literacy or sequencing and memory difficulties, and this raised design issues with use of long questionnaires in Phase Two. Three reasons for taking a structured approach in this case were, firstly, the objective of reducing the need to write, secondly, the potential need to look at frequencies of response between groups, and finally resource constraints. The constraints meant that the measures needed to be structured, mostly using closed questions and number scales to facilitate coding, data entry and analysis. The risk with closed questions is that, due to the researcher interpretation, the response options do not cover all outcomes. A qualitative questionnaire was therefore also included to counter the researcher's expectations concerning key topics and concerns (see *App. 3.4 g*). Qualitative questionnaires are less structured, being word based, and require more thought and writing for the participant. Clarity of instruction and question was very important, as these were self-completion questionnaires in a very large percentage of cases.

Log sheet

As part of Phase One the log sheet layout contained sections relating to age, gender, course – including field and format, start and end dates – leaving status code, summary of contact reasons and support types used (see *App. 3.2*). Additional fields were to be generated for later statistical tests, including the academic years that each student was enrolled (see *Appendix 4.4.1 – Core SPSS*). Identification was expressed in terms of a year and also the age at which it occurred. Date formats were such that they could be subtracted to show how many days / years had passed between events, such as identification and course enrolment.

The Questionnaires

Measures were selected and questions formatted in light of awareness about dyslexic issues with text, font and spacing presentation. The three pilot interviews set the basic scope for the measures used. The issues that emerged were: the study skills needed for HE; the level of reading needed to do a dissertation; discrepancies between written and practical outcomes; and academic standards, including referencing. The first two issues influenced the choice of VARK as the learning styles measure (see *Section 2.2.3* and *Section 3.3.2 – Learning mode preferences*). Differences in expectation and experiences, apparently between younger and mature students, highlighted the need for the addition of age and personality measures. There was a clear need for some dyslexia background data, even for participants who were not interviewed, including the response to recognition of dyslexic and current responses to, and expectations of, support. There were indications that course choice might have been modified by previous educational experiences, perhaps unnecessarily, which led to a ‘Course Details’ measure.

The possible external factors influencing the use of support include: dyslexia-associated problems, personality, past experience of support, and availability, type and format of support, and course structure. It was anticipated that some of these would have an effect on the use of support and indeed course selection.

As a result of ethical considerations, reply slips as well as information sheets and consent forms were developed and used in conjunction with a number of survey tools for this research (see below). The final selection of materials amounted to eleven different sources of information, which are each described below. For sample copies, see *Appendix 3.4*.

Administrative – Ethics and Data protection:

- a) Information Sheet
- b) Reply slips, Permission and Consent

Main Survey:

- c) Dyslexia and Course Details - Introductory questionnaire
- d) Dyslexia – BDA checklist
- e) Course Questionnaire - Introductory
- f) Module Questionnaire - First term / Continuing
- g) WAY Statements
- h) Learning Mode Preference Questionnaire - VARK
- i) Intelligence - Multiple.

Personality Survey:

- j) NEO-FFI, Big-5 Personality

Support Survey:

- k) Equipment and Study Support Questionnaires – Needs Assessment review

a) Information sheets

The information sheets were intended to ensure informed consent to participating in the study. They aimed to cover identification of the researcher, and introduce the research, its purpose and procedures. Statements on confidentiality, compensation arrangements, and the right to withdraw were also included (see *Appendix 3.4 a*).

b) Reply slips, Permissions and Consents

Students could respond to articles by e-mail or by returning a reply-slip from flyers, agreeing to further direct contact. The reply-slip constituted a response from potential participants, showing an interest and giving a dated, signed permission to make direct contact. Permissions or Consents were a single sheet completed once by a student who agreed to take part (see *Appendix 3.4 b*). An initial e-mail response and a signed consent form or just a consent form, from the questionnaire pack, was needed.

The consent forms were completed early in the process of involvement with the research; they asked for a preferred means of contact, detailed consent to access specific data, and a dated signature. Returned consent forms showed that a student had received the information sheet and questionnaire pack(s), and was willing to take part. The information provided indicated which of the three initial research groups (A, B, C) would probably be appropriate (see *Section 5.4.1*). Permission forms covered access to or agreement to provide Personal Informal Portal (PIP) page details (see Definitions), to grant access to

CSMS (administration computer records), Student Services dyslexia records, and acceptance of the projects' data protection statement.

Main Survey:

Introductory questionnaires - Dyslexia background and Course details

The aims of these measures were to clarify the dyslexia context and to cover expectations of participants' university course. These measures were intended for completion once, ideally early in the course, before the student became fully adjusted to student life and modified their expectations of the course or themselves. Alternatively, completion would take place soon after recognition of dyslexia. These measures were part of the main questionnaire group.

c) and d) Dyslexia

The Dyslexia Background Survey was created for this study (see *Appendix 3.4 c*).

Information covered the student's home language, age, when and where dyslexia was first recognised, any support prior to university and some course details, including duration and structure. Consent, in principle, to access dyslexia records in Student Services, and the computer systems, both administration and PIP page information, was included again. It was combined with use of the British Dyslexia Association (BDA) Checklist (1994) (see *Appendix 3.4 d*).

In this research, all the students were already recognised as dyslexic with supporting Education Psychologists' assessments. The objective of using the BDA Checklist was to have a short, standardised outline of dyslexia as experienced by the student, as the participants' perception of their own skills would probably be relevant to their decisions on use of support.

The BDA Checklist was taken from research into using dyslexia screening checklists with 679 adults (Vinegrad, 1994). His sample contained 32 known dyslexic people. Of the 20 questions, 12 have been identified as the best indicators (see *Appendix 6.2.4 – BDA gender*), although positive responses to nine or more questions is considered a 'powerful indicator of a difficulty.'

Participants are asked to respond, by ticking 'Yes' or 'No', for all questions, with the proviso: '*If in doubt tick the answer that you feel is true most often.*' This assessment is subjective and assumes that the person is sufficiently aware of their own skills and abilities

to compare them to others – for instance when answering the question: ‘*Do you take longer than you should to read a page of a book?*’ Another potential problem is that people tend to avoid difficult tasks unconsciously, hence are unable to respond to questions about difficulties experienced.

e) and f) Course and Module Questionnaires

The ‘Course’ and ‘Module’ measures looked at the study experience and had the potential to investigate module outcomes in relation to the support used data in a more personal manner than PIP data offered. Both questionnaires were designed for this research and included Likert scales (see *Appendix 3.4 e* and *3.4 f*). The Course Questionnaire covered reasons for coming to university and course details including course structure, scope for module selection, and module selection factors (see *Appendix 3.4 e*). Reason statements were derived from pilot interviews. The intention of the Module Questionnaire was to look at students’ perception of modules studied and how good students were at gauging their own success, as this might reflect on self and dyslexia awareness and the need for support. An alternative page was created for continuing students, where the student’s perception of the current term and results for the previous terms’ modules were gathered (see *Appendix 3.4 f – First term and Continuing*).

The actual module and degree results were available from PIP data where permission was granted. This linked to the research questions on participants’ experiences of studying at the university and the impact of support on their studies.

g) WAY Statements

Self-image can be addressed by ‘WAY’ (Who Are You?) Statements (Kuhn and McPartland, 1954) cited in Gross (1992). They give insights into social roles and personality traits, being essentially descriptive. The measure can identify issues that the researcher had not anticipated. It has the potential to show that participants have other priorities or sources of stress – how they see themselves in fact. An open-ended question, ‘Who are you?’ is completed in the form of 15 response sentences, all beginning ‘I am ...’ (see *Section 4.3.5 – The Main Survey* and *Appendix 3.4 g*). WAY statements offer a snapshot and were used in this project to record the student’s current sense of self.

h) Learning Mode Preferences

Learning Mode preferences were considered to be important for a number of reasons. Firstly, learning modes were topical at the time, and it was of interest to see whether

dyslexic students differed in their preferences from other HE students; for instance, dyslexia has often been associated with visual strengths (West, 1991). Secondly, there was an opportunity to consider whether multi-sensory support influenced modal preferences. Finally, if there were modal differences, this might prove significant in deciding what constituted 'reasonable adjustments' in presentation of material or assessments.

In general, students show a positive response to questionnaires on this subject. There is an instinctive belief that the information is useful, even if there is less proof in an academic context (Coffield, 2004). Supported dyslexic students, during the period of this study, were more likely to have been exposed to multimodal teaching and explicit guidance on study strategies at school, as compared to any other student peer group. It might therefore be anticipated that awareness of preferences and strategies might have an effect on HE study outcome.

A number of existing 'Study Mode Preference' questionnaires were considered for use in light of the following factors: target age group; length and ease of completion; and use of non-academic scenarios for the questions. The Visual, Auditory, Read/Write and Kinaesthetic Questionnaire (VARK) Version 2, developed by Fleming and Bonwell (1998), was chosen. It has been stated by Fleming (2001b) that VARK indicates mode preferences which can be obscured by experience. The preferences are not necessarily directly relate to cognitive strengths.

The inclusion in VARK of a text mode – 'Reading/writing' as a category distinct from a visual modality – was seen as important when working with a group with difficulties at least in part associated with literacy (see *Appendix 3.4 h*). Another desirable design feature was the inclusion of questions to look at the choice made in the absence of each mode and an element of cross checking (see *Appendix 3.4 h.1*). The pragmatic questions were likely to highlight differences between habituated learning strategies and natural strengths or responses. It was hoped that the lack of a study context would prevent participants giving the response they 'thought' the researcher would expect.

The focus of VARK is on receiving or giving information, rather than processing or organising it. The 13 individual questions potentially consisted of multiple categorical responses (see *Appendix 3.4 h.1*). The participants were allowed single or multiple-choice answers, but were also instructed to 'leave blank any question that does not apply'. On

completing the survey, students could receive feedback on their learning styles and advice about their best study strategies, which could be of benefit to the respondents. The questionnaire (v.2) was available on the web - <http://www.active-learning-site.com/vark.htm> and subsequent versions on <http://www.vark-learn.com/english/page.asp?p=questionnaire>. The questionnaire had not been normalised, although response statistics were regularly updated by Fleming, at least once a year. This provided data from web-site completions, especially by the academic community, and offered a basis for comparison.

i) Intelligence

At a cognitive level, objective IQ scores help to identify specific difficulties in areas such as working memory and processing speed. The model of intelligence a person adopts could influence their views on whether these scores can change as a result of intervention, or are relatively fixed (see *Section 2.2.2 – Goals and Models of intelligence*). WAIS tests were not undertaken as part of this study, but details of some WAIS scores were available, where permission was given, from Student Services.

WAIS-III provides an objective test of the core areas of verbal comprehension, perceptual organisation, working memory and processing speed (Kaufman and Lichtenberger, 1999, p. 121) (see *App.2.1* and *App. 3.4*). Reading and writing are not tested, although co-ordination and dexterity are. The sub-tests normally combine to give consistent scores for all indices. The WAIS-III tests have been normalised, and no difference is to be expected between genders. The undergraduate population might reasonably be expected to score above the average for their chronologically matched peer results, although this may have become less pronounced with changes in admission policies.

In this study it was decided to also use a subjective inventory to explore a wider range of 'intelligences', potentially nine in all, based on Gardner's work (see *Appendix 3.4 i.2* for details of the intelligences and *Section 4.3.5*). This inventory assesses the student's perception of his or her own intelligences, or strengths, (McKenzie, 2002 – http://surfaquarium.com/MI/mi_domains.htm). The measure involved completing nine sections, with 10 questions each. The multiple intelligences (MI) self-test potentially illustrates how the strengths and weaknesses in the cognitive profile may have manifested themselves in life choices and study strategies. This survey was viewed as a snapshot rather than giving a fixed measure. There are no norms for this assessment.

In the MI Inventory, the participant was asked to reflect on real world tasks and choices rather than performing specific tasks in test conditions. The individual questions had the additional merit of addressing a number of study preferences and organisational strategies under the guise of various ‘intelligences’. Whether these intelligences reflect innate abilities or social constructs is not clear. The intelligences are labelled: Naturalist; Musical; Logical; Existential; Interpersonal; Kinaesthetic; Verbal; Intrapersonal; and Visual. At first glance some of the intelligences covered similar areas to the learning mode preference questionnaire (VARK) in terms of strengths in Musical or Auditory, Visual, Verbal and Kinaesthetic preferences. Thus, there was potential for a comparison, although the scope of the Kinaesthetic proved greater in the MI measure.

McKenzie’s survey looked at ‘intelligences’ relating to self-management as well as interaction with other people. According to McKenzie (2002, http://surfaquarium.com/MI/mi_domains.htm) the nine forms of ‘intelligence’ in this questionnaire could be grouped into three domains, which he called Analytical, Introspective, and Interactive; (see *Table 3. 5* – using questionnaire sequence). The domains offered an alternative way of grouping the questions for analysis.

<u>Domains - 4</u>	<u>Intelligences - 9</u>
Analytical	Naturalist Intelligence – ability to recognize and categorize plants, animals and other objects in nature.
Analytical	Musical Intelligence – ability to produce and appreciate rhythm, pitch and timber
Analytical	Mathematical-Logical Intelligence – ability to think conceptually and abstractly, and capacity to discern logical or numerical patterns
Introspective	Existential Intelligence – sensitivity and capacity to tackle deep questions about human existence, such as the meaning of life, why do we die, and how did we get here.
Interactive	Interpersonal Intelligence – capacity to detect and respond appropriately to the moods, motivations and desires of others.
Interactive	Bodily-Kinaesthetic Intelligence – ability to control one's body movements and to handle objects skilfully.
Interactive	Verbal-Linguistic Intelligence – well-developed verbal skills and sensitivity to the sounds, meanings and rhythms of words
Introspective	Intrapersonal Intelligence – capacity to be self-aware and in tune with inner feelings, values, beliefs and thinking processes.
Introspective	Visual-Spatial Intelligence – capacity to think in images and pictures, to visualize accurately and abstractly

Taken from <http://www.thirteen.org/edonline/concept2class/month1/> 16/04/02

Table 3. 5 Multiple intelligences descriptions and McKenzie domains, in questionnaire order

The MI measure offered an insight into logical versus naturalistic strengths. The Naturalist Intelligence is sometimes represented as showing strengths in classifying, namely recognizing categories and establishing hierarchies, and formulating schemas (for events, items and situations). The main emphasis is on an interest in living things and the outdoors. The Logical Intelligence addresses work with numbers, problem solving by asking questions and exploring patterns and relationships; here the tasks of categorising and classifying relate more closely to working with abstract patterns and relationships.

At least half the MI questions on Verbal Intelligence related to writing tasks or involved a written component, while four had a spoken element and one referred to reading (see *Appendix 3.4 i.3* for MI questions). MI verbal questions made reference to modes and activities, a substantial difference from the WAIS VCI, which considered the information acquired but not the means by which it had been accessed and assimilated. The content of MI Verbal was more closely related to VARK Read/write.

Assessment of Bodily Kinaesthetic Intelligence, in the MI questionnaire covered practical hands-on and active doing. Co-ordination was only addressed implicitly, but might be assumed from a liking for sports, crafts and using tools. Some spatial elements were also covered by questions on Visual Intelligence, and in many questions spatial skills and visualisation abilities were both addressed.

Personality Survey:

A personality questionnaire was included to allow consideration of whether the personality could be more significant in influencing the use of support and choice of strategies than membership of any dyslexia or study strategy related sub-group (see *Section 8.2.1 – Reaction to recognition of dyslexia as an adult*). Personality was considered both as a factor influencing support use, and potentially as something influenced by past learning experiences.

j) NEO Five Factor Inventory

The survey chosen was the NEO Five Factor Inventory (NEO-FFI) which places personality characteristics on a continuum with a normal distribution profile. The five factors or domains have been labelled Neuroticism(N), Extraversion(E), Openness to experience(O), Agreeableness(A) and Conscientiousness(C) and divided into facets (see *Table 3. 6* and *App. 3 8* for the questions and *App 6.85* for scoring).

Factor / Domain	Facets
Neuroticism	Anxiety, Angry hostility, Depression, Self-consciousness, Impulsiveness, Vulnerability
Extraversion	Warmth, Gregariousness, Assertiveness, Activity, Excitement-seeking, Positive emotions
Openness	Fantasy, Aesthetics, Feelings, Actions, Ideas, Values
Agreeableness	Trust, Straightforwardness, Altruism, Compliance, Modesty, Tender-mindedness
Conscientiousness	Competence, Order, Dutifulness, Achievement striving, Self-discipline, Deliberation

Table 3. 6 Personality factors and facets (Costa and McCrae, 1992 pp. 16-8)

The measure used in NEO-FFI is the short form of the measure NEO-PI, with normalised data. Commonly referred to as the ‘Big-5’, the short form did not provide the details to profile the sub-facets of each domain. It was selected because of ease of administration and the possibility of comparison of the normalised data with the dyslexic participants’ results. Big-5 consists of the 60 key questions from the full self-assessment. The NEO-FFI questions represent the 12 items in NEO-PI with the highest positive or negative loading for each domain (see *App. 3. 7*). There is no indication given to the participant about which aspect of personality is being measured by any question. For each question there is a five point Likert scale from ‘Strongly Agree’ to ‘Strongly Disagree’, which is coded as a number value as part of scoring. The number value attributed to the scale is reversed for negative statements (32) to ensure that ‘0’ is scored for the most favourable response and ‘4’ for the least. A response of ‘Neutral’ was always given the value of two, with the question colour flagging negative questions and prompting the reversal of values. The coded values are totalled to give domain totals, then converted to *T*-score values to accommodate gender differences (see *App. 6.85*). *T*-score data was used for analysis as it brought both genders onto one scale, with 50 as the mid-point. There were five bands for *T*-score results ranging from ‘Very High’ to ‘Very Low’. The maximum *T*-score on the provided scale is 74 and the minimum is 26. The average band range was a *T*-score of 45 to 55 inclusive. The NEO-FFI was designed for use with adults aged 21 years and over. The normal distribution scores vary with age group; for example, college students typically seek higher levels of stimulation than adults, and it may need to be considered that this university sample had a large number of mature students.

Two personality dimensions are considered to have special relevance for education: ‘Openness to experience’ and ‘Conscientiousness’ (Costa and McCrae, 1992). Openness and Conscientiousness might reflect the effort and commitment put into modifying past study strategies in the light of offered support. The former is ‘modestly related to

intelligence’ (Costa and McCrae, 1992) and is more strongly related to divergent thinking. Openness to change or originality includes facets relating to lateral thinking, acceptance of change, and preferred view – either detailed or holistic. Conscientiousness suggests that a person is well organised, purposeful and persistent, which is a good basis for academic achievement, and potentially at the heart of the way that dyslexic people interpret their efforts and the outcomes. Finally, Conscientiousness includes the degree of dissatisfaction with the status quo as a possible source of motivation.

There are a number of views about where the personality traits of Conscientious and Openness might lead in terms of academic study, including the possibility that people could be more likely to avail themselves of all opportunities, or to be unconventional and liable to misunderstanding, or frustration in traditional classes. The ability to plan and the need to organise are also factors that affect learning. Other dimensions may influence the most suitable presentation for support: i.e. whether a person would prefer it to be individual, in a group or IT based self-help.

Conscientious may have a significant role to play in compensating strategies for dyslexics. The degree to which perfectionism to ensure reasonable work is allowed without ‘wasting’ effort for little gain on the returns is probably a balancing act many dyslexics have to address at some level.

Support Survey:

A quality assurance review of the DSA assessment experience, was carried out in parallel to this study and formed the basic Support Survey sample (see *Figure 4. 2*).

k) Equipment and Study Support Questionnaires

The development of measures providing feedback on the type and degree of support, both offered and used, represented a separate opportunity to contact potential participants. Equipment and Study Support measures therefore gave a second route into the research, and also became a source of further detail for existing participants who responded to the questionnaires (see *Appendix 3.4 k*). The focus was on the ‘use’ of recommended IT equipment and support, both in terms of what was being used and its usefulness (see *Appendix 3.4 k.1*). Those entering this way were followed up, later in the study, to see if they would complete the main survey as well.

Design flexibility and structure of the measures were important issues, as not all participants were going to be at the same stage of support and assessment. In some cases the questionnaires would be received as part of a generic mail-shot, hence by-pass instructions were needed for sections that did not apply. Where an assessment had not taken place, only the Support Questionnaire need be completed, to avoid irrelevant questions de-motivating participants. This led to the repetition of a multi-part question on software from the Equipment Questionnaire in the Support Questionnaire, although this had the benefit of verifying the rankings given.

As there is not a standard list of recommendations for support, it was thought helpful to include the likely items in the measure. The questions therefore acted as a reminder of what might have been recommended as well as a consistent generic label for what had been received. The measure accommodated students who reported that they had already purchased a computer. The design of the questionnaire ensured that usage data was collected even if recommendation or purchase data was not applicable.

The data in the Equipment and Support Questionnaires consisted almost entirely of nominal categories and ordinal variables. The only scaled data were dyslexia identification age group. Questions included: *what was recommended, bought and actually helpful* – ranked; *how it is used*; *what have you never used in the context of your course* – i.e. avoided or the need has not arisen. The question response types in both measures were split between ‘Yes / No’, ‘Select which applies’ and ranking. Many of the questions asked participants to give the rank order for certain aspects of different support types (Equipment, Software, Technical, Study). There was no other data with which to compare the results, although Farmer *et al.* (2002, p. 103) found computers important to students.

3.3.3 The Interviews

Initially, pilot interviews were needed with students about to leave the RI (see *Section 4.3.3 – Pilot interviews*). These were totally unstructured and took the form of a conversation about the experience of dyslexia and studying in HE.

The main interview data was of a qualitative nature and encouraged a deeper reflected response. The nature of the format was verging on informal, being an open/guided approach of an exploratory nature with unstructured responses. The purpose was to gather

data and sample opinions in order to ‘illuminate’ the situation. Aiming to go deeper into respondents’ motivations and reasons, the target was frank open responses.

It was considered essential to record interviews (with participant consent) due to the amount of interpretation and reflection needed for phenomenographic analysis. However, analysis of recordings transcribed to text could be considered a significantly different proposition to phenomenographic analysis of an interview recording (see *Section 3.2.2 – Interview theory*).

The decisions made for these interviews related to their scope, structure and the need for prompts. The common areas to be covered were the context for the recognition of a student’s dyslexia and its impact. To help develop a sense of how the current situation evolved, a chronological review of educational experience was proposed, with attention given to activities beyond the school curriculum and sources of confidence. The main theme was the student’s perceptions of ‘self’, and of particular interest was how a student ‘experienced’ academic, hobby and support situations.

The next stage of developing an interview methodology was to establish some prompts and probes for an open format interview (see *Appendix 4.3*). Many of these responses would be dealing with accounts of experiences, which had been interpreted and conceptualised by the interviewee before they were raised in the interview. However, in other cases the area being addressed may have been suppressed, and prompts would be needed to help recall and encourage elaboration. It was anticipated that the perception of a reported ‘reality’ might be different from that of an observer, but this was considered to be of importance, since the interpretation formed the basis of the student’s future actions. Due to the one-off nature of the meetings, general information was needed about background, school, and more particularly the university course and experience (see *Section 4.3.6*). Prompts about the role of support in the participant’s university learning were also included.

3.3.4 Statistics – Analysis of the Research Measures

As part of the research design descriptive statistics, including correlations, were to be used to analyse the results of this study and place them in a national HE context. It was necessary to consult two sources – HESA and UCAS – for national data. The purpose of undertaking a review of statistics from external agencies was to consider national trends, such as whether wider participation was being achieved in terms of increased numbers of

students and increased proportions of disabled students within the whole student body. Statistics were needed to compare the RI to national data for both the 'total' HE student population and the dyslexic HE student populations.

Statistics were to be used to describe the historic leavers' data for the period 1992-Oct 2001 (see *Section 4.1.1 – 1.Historic sample – Leavers' data*) and form the means of determining a representative sample (see *Section 5.5.2*). This data was then used to develop the research groups indicated by the focus activities with relation to the time at which known dyslexic students made contact with the support team (see *Section 4.1.1* and *4.1.2 – Focus activity*).

In part statistics were used to verify findings for measures used with this sample against normalised data where available. Statistics for any of the above measures could be used to produce descriptive data for both individual question responses and correlations between sub-totals within questionnaires and between measures. The analysis also included the use of data reduction techniques to look for profiles, groupings or clusters in RI data (see *Section 3.2.3* for details of statistic methods) (Field, 2005; Pallant, 2005). Some factor analyses addressed the validity of the design constructs for the sample population, while others looked for a commonality between a number of variables. Cluster analysis was adopted to look at ways of grouping cases rather than variables.

3.4 Design Summary

Design choices were made in light of plans to use a mixed paradigm. The design included Positivist aspects in relation to determining the features of the dyslexic HE student population and defining what would constitute a representative sample. At the same time, the survey element was based on an Interpretative view, starting from the bottom and working up in order to look for social constructs, with a phenomenographic interest in how the participants conceive their world. The analysis design reverted to a Positivist approach to look for factors or clusters of cases.

There were ethical issues in relation to first contact and the disclosure of dyslexia. Within the confines of data protection, the sample population had to be made aware of the research in such away that their dyslexia was not disclosed to others. Data security and confidentiality had to be addressed by physical and procedural means. The design drew on

both established measures or surveys and ones specifically designed to cover the institution in question, as well as interviews.

The design choices allowed investigation of students' use of support as either a response to stimuli or intentional actions. However, the design also aimed to have enough rigour to be relevant to the academic and practitioner communities, so that it had the potential to facilitate resource management and policy planning.

Chapter 4 – Methodology, Participants and Procedures

4.1 Introduction to Actualising the Research

This chapter describes how the participant sample was found and the data gathered.

Although attempts were made to access the ‘whole’ RI dyslexic student population, the sample that participated in the surveys was rather smaller. The research was planned in three phases. The first was analysis of existing RI databases of historical data for students who had left, and comparison against national data. The second was the collection of data, exploring learning styles and personality from current students (see *Section 3.3.2 – Main Survey; Personality Survey; Support Survey*). The third phase was a detailed follow-up with selective interviews of a representative subset of those who had completed the research questionnaires (see *Section 3.3.3*).

4.2 Sample Participants

The population for this research were studying or had studied at the research institution (RI), which was a successful new university with a long-standing reputation for dyslexia support. The population consisted of students known to Student Services in relation to dyslexia. Dyslexic students who did not contact Student Services fell outside the framework of this study, although attempts to reach these people were made through the student newspaper. The few who made contact as a result of newspaper adverts then signed up with the support team. By only using students who had been in contact with Student Services, the representative nature of the findings was limited in terms of dyslexic students as a whole. The sample was inevitably going to be dominated by people using, or on the periphery of, the support system. However, the data did reflect the demands put on resources at the RI and shed light on some factors relating to support use.

The sample (N=83) for piloting an initial group of potential questionnaires and paperwork was based on the RI’s e-mail list for dyslexic students, most of them at the end of their courses in June 2000. The historic data for students who had left (Leavers’ data) was analysed to enable calculation of a representative sample model as there was not enough information on the nature of the dyslexic RI student population.

4.2.1 Methods of contact

For the second phase, with the focus on the entire population of dyslexic students at the RI, it was important to avoid unintentional bias by excluding part of the population (see

Section 3.3.1). Participants were initially recruited by face-to-face appeals in group support sessions and the Learning Skills module. This accessed the relatively small numbers who were actively using support at quite an intense level, and therefore was not fully representative. Other ‘gatherings’ of dyslexic students occurred during workshops in Induction Week and exam weeks. These gave up to four opportunities a year to contact potential participants, including students who were making the minimal use of support.

Various means of advertising the research were used (see *Section 3.3.1 – Phase Two*). Student Services’ newsletter for dyslexic students was sent to all dyslexic students every term, unless they had specifically asked not to receive it. The newsletter carried both an initial request for participants and a number of follow-ups tailored to the phase of the research or aiming to redress an under representation in the samples for a survey or the interviews, based on disclosure point, age or gender.

Items appearing in the university newspaper targeted a larger audience; however dyslexic students were potentially too busy keeping up with their studies or avoiding non-essential reading to have read it. Support staff, aware of the study, therefore mentioned it to additional students who either had requested not to receive the newsletter or were just coming into the system.

By December 2000, 47 people had returned the Permission or Consent forms (see *Section 3.3.2 b* and *Appendix 3.4 b*), of whom 44 agreed not only to take part but also gave permission for the researcher to access data from both Student Services relating to dyslexia and CSMS computer records. A further 25 e-mail consents without supporting signed and dated permissions had also been received. All students who were dyslexic and offered to participate were accepted into the research. However, too few participants had been attracted to achieve the required sample size and profile. A blanket mail-shot of the total population was therefore arranged.

Two mail-shots formed the basis of contact for the majority of participants; the Main and Support surveys (see *Figure 4. 1*). The Support Survey mail-shot gave the opportunity to bring this research, once more, to the attention of students applying for DSA support arrangements and equipment. The larger sample allowed for effective funnelling of the sample into the Big-5 personality questionnaire.

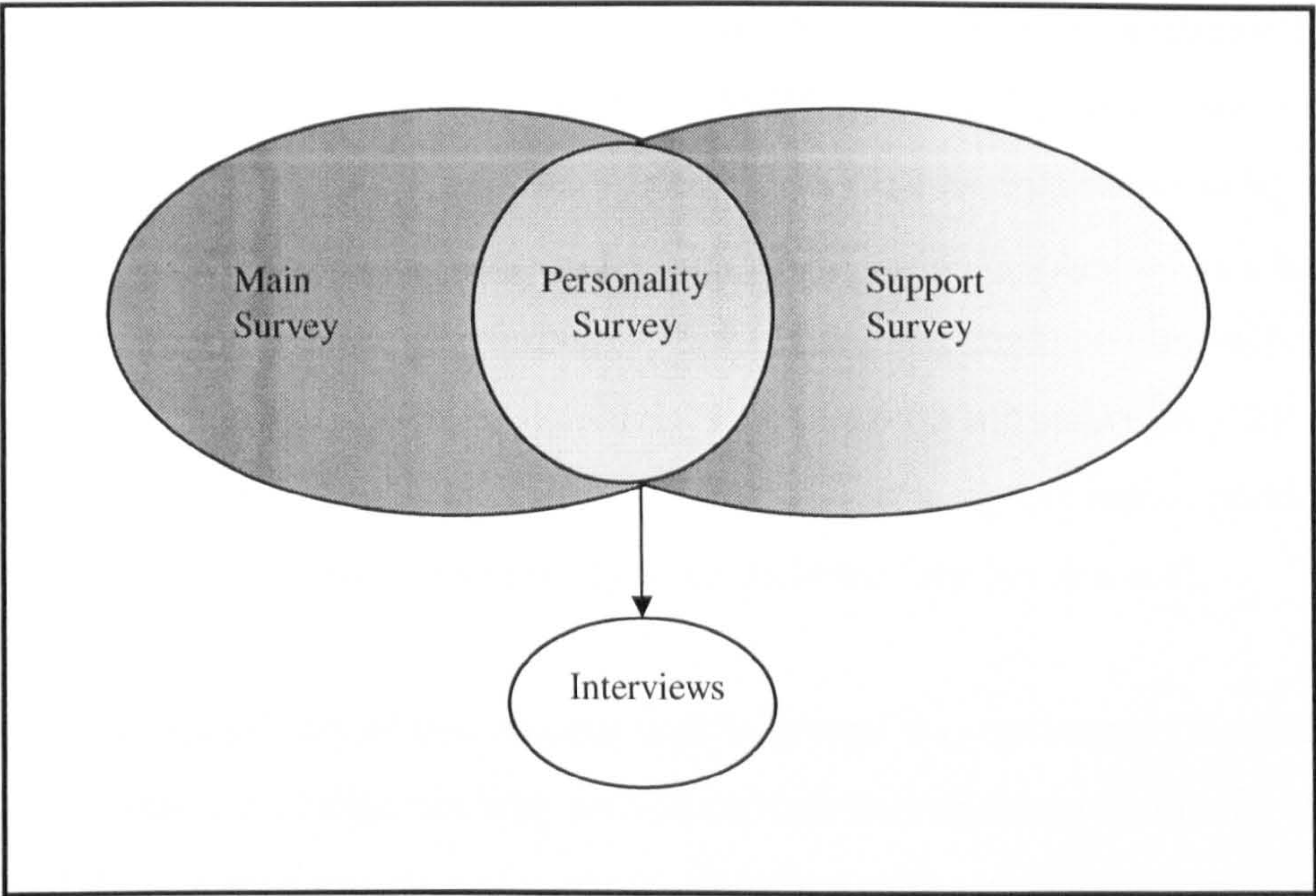


Figure 4. 1 Relationship between data sources for Phase Two

It was hoped that the interview sample (Phase Three) would represent the population model drawn from historic leavers' data (Phase One).

The Main Survey mail-shot to 480 students, sent out in the summer of 2002, succeeded in providing a reasonably large sample size. With postal questionnaires a response rate of 30% would have been good, and this was achieved with dyslexic students by Farmer *et al.* (2002, p. 69) across two universities, with more women than men responding. By the end of this study the sample included 267 people who had taken part to some degree, 226 completing questionnaires. The response rate for the Main Survey from all approaches to students was 34% and 30% for the Support Survey mail-shot, but 60% where the covering letter was personalised for 161 students. Participation ranged from granting permission to access data through to completing all questionnaires and an interview.

The following sections look at the samples for each of the three phases:

4.2.2 Phase One: Historic sample – Leavers' Data

The initial stage of this study required an objective modelling exercise to describe the dyslexic student population of the RI based on Student Services' data. The modelling was supplemented by statistics from the HESA, Admissions and Exam offices, and the pilot interviews.

The data was extracted from summarised details of all dyslexic students who had left the RI. The earliest data related to students between 1988 and 1990/91 but this was very

limited (see *Section 5.2.1, Table 5.1*). National statistics were available from 1994/95 onwards. In total there were data for 1655 RI students. Leavers' data, which excluded subsequent research participants from the Historic data, numbered 1450 cases (see *App. 5.36*). Data for students who left by Oct. 2001 (N= 885) was used as a basis for determining a representative sample. Data collection continued throughout the research providing additional information on participants who left before July 2004, with their consent, and some comparison with the pre-research representative period. Those who started after 2001/02 were unlikely to be included (see *Section 4.4*).

In the proposal, use of two student sample groups was envisaged (Singleton *et al.*, 1999): one composed of students who arrived on their course already knowing they were dyslexic and the second consisting of students identified as dyslexic during their studies at university. After the pilot interviews, it was clear that an additional distinction was needed between those who started a course knowing they were dyslexic and sought support straight away, and those who delayed. The research groups were reviewed as a result, and finally formed four groups for the purposes of analysis in the light of data. The new group allowed the research to address the extended delay before contact with support seen in some data (see below: Phase Two: Survey sample – Research groups, and *Section 5.4.1* for final groups). The historic data established an idea of the quotas by gender and age and research group desirable in the sample (see *Section 5.5.1*).

4.2.3 Phase Two: Survey sample

There was no attempt at sampling for the Main Survey in Phase Two (see *Section 4.2.1* above). The participating sample volunteered by completing some or all of the paperwork. The data gathering design channelled the different entry routes together (see *Section 4.3.2*) to complete the Personality Inventory. Wherever possible, participants were then asked to complete the questionnaires for the 'other' entry route. The Module Questionnaire and WAY Statements were considered to be the least essential measures if time was short and not every measure could be obtained. The survey sample was self-selecting and numbered 269, of which 26 gave consent, but did not complete any measures. Of the participants, 64 had not left at the end of the data gathering and so there was no Leavers' data for them.

Research groups

The key points that were investigated were the degree of awareness about their dyslexia before the participants entered university, and the stage at which they decided to contact

the support services (see *Section 3.3.2 – Reply slips* and *5.4.1 – Research groups*). The initial groups were A, B, and C. If there were no exams on a course, then university support might not offer enough incentive for registering. The ‘final’ groups were as follows:

Group A: knew they were dyslexic and registered with Student Services before starting their course.

Group B: knew they were dyslexic and registered during the first term.

Group C: did not realise that they were dyslexic until identified at university.

Group D: knew they were dyslexic and delayed contact by two or more terms (additional group).

4.2.4 Phase Three: Interview sample

The representative interview sample was taken from those participants who had volunteered to be interviewed (see *Appendix 3.4 b.3–b.5*), as well as having completed some surveys. This was non-random sampling, using a quota with a view to having 15 people from each research group (see *Section 3.3.1* for Phase Three). To maintain the sample group across the phases, an allowance for drop-outs was also made. The aim was to have two more people than required in each group to allow for attrition.

Selection based on criteria removes the random element, but introduces the risk of researcher bias, which is a weakness. Within the interviews the objective was to cover each permutations of gender, three age groups and finally four research groups with two interviews, while being representative of the trends in the historic data. Resource limitations contributed to data collection issues including an inadequate sample size for age group data (see *Table 5.8*). The 47 actual interviewees were taken from the survey respondents which underrepresented males based on RI trends (see *Table 5.6*). Research Group D was underrepresented for both genders (see *Table 5.7* and *Table 5.8*).

In practice not all questionnaires had been completed by those willing to take part in an interview, so at the interview students completed, or took away, the questionnaires they had missed. This had a disadvantage, in that although they took the missing questionnaires and a reply envelope, this did not guarantee return of completed measures.

4.3 Procedures

Procedures for data gathering were established to address ethical and data protection issues. The procedures covered the piloting of the research, the three phases of data gathering and analysis, and the two entry routes into the research. The procedure design allowed for alternative presentation of the measures, for example, using a reader and or scribe. The possibility of measures being completed at different times, and the interviews coming after the survey, made it advisable to consider attrition rates and a procedure for reminders and follow-ups for the entry surveys. Where part of a measure question is incorporated in the text, it is italicised (see *Section 4.3.3 – Pilot interviews*).

4.3.1 Ethics and Data Protection

This research required several of the ethics and data protection points to be addressed (see *Section 3.2.4*). In particular, dyslexic students were deemed a vulnerable group and there were concerns about the type of data being gathered, its storage, and anonymity. However, it was decided that as this study concerned HE students, with the right to withdraw from the study at any stage, vulnerability was not an ethical issue requiring further action.

Although dyslexic students in HE were in no way considered to lack the capacity to understand the research, they were potentially vulnerable to: involuntary disclosure of dyslexia to others as a result of participation; accessibility issues with the materials used and the impact of any failure to complete it; and emotional responses to reflecting on past experiences. While direct action was not thought necessary consideration of these areas was given during design and procedure development. Care was taken that any communication referred to research on the cover or header and did not inadvertently disclose dyslexia to peers and others. At the design stage attention was given to dyslexic preferences in relation to presentation to reduce the literacy demands placed on students by completing the surveys. The factors included: the paper used (see *Section 3.3.2*); question form, wording, and length; page layout and font. Questionnaire completion by scribe was an option offered on the Information sheets, either by phone or face-to-face (see *App. 3.4 a.2*) also included in the follow-up paperwork (see *App. 3.4 b.3*). One reason for using WAY statements was their structured nature (see *App. 3.4 g*). Starting the sentence ‘I am ...’ for a specific number of statements was considered an aid to remaining focused on the task of reporting self perception and protection from a ‘failure to complete’ scenario by framing the reflective task rather than posing an open question.

The issue that 'research could induce psychological stress or anxiety' had to be addressed (<http://www.brookes.ac.uk/research/ethics/ethicscode.html>, 2000). It was concluded that anxiety was not expected, some individuals might have a reaction. Participants who undertook an interview were therefore made aware that they could contact the researcher or Student Services (if that was more appropriate) should issues arise from recalling memories or their reflections during or as a result of the interview.

RI regulations stated that it was only acceptable to offer 'reimbursement for travel expenses or in some cases time', while 'the creation of inappropriate motivation should usually be avoided.' (<http://www.brookes.ac.uk/research/ethics/ethicscode.html>, 2000; http://www.brookes.ac.uk/res/policies/ethics_codeofpractice.pdf, 2005). Consequently, care had to be taken when mentioning the possibility of compensation for time or expenses, so that this was not to be seen to be a financial inducement. In practice, compensation for time was accepted in only a few cases.

Information in any way related to dyslexia was considered sensitive and could not be obtained or disclosed without the individual's explicit written consent. The ethical importance of including a 'statement of purpose' for the data collection and acquiring a dated signature of consent (see *Section 3.2.5*), for both contact and further participation, was clear from the code. As a result of ethical considerations reply slips as well as information sheets (see *Appendix 3.4 a*) and consent forms were used (see *Appendix 3.4 b*).

Release and data protection documents were developed with help of the Psychology Department and Computer Services (see *Section 3.2.5* and *Appendix 3.4 b.2*). The 1998 Data Protection Act led to changes in Student Services procedures for earlier files relating to information on students who had left. The data was summarised year on year to provide a basis for analysis (see *Section 4.3.4*).

Issues of anonymity arose concerning the data gathering, storage, and analysis. It was considered that grouping statistics by research group, gender, age and field might result in such a small number in each group as to be disallowed for fear of identifying individual students. With the intention of avoiding such problems with identification, a consent clause was therefore added to the initial documents; this covered willingness to take part in the research, and agreement to data storage, publication and access to personal details.

When making contact with participants care was taken not to mention dyslexia in front of the students' peer group around the RI.

A personalised cover letter used in some cases for Support or Equipment questionnaires had a clause asking whether the information gathered could be used in an anonymous form in RI and national studies looking at the best ways to support dyslexic students (see *Appendix 4.1*). The data protection clause was included in the Consent form participants received, along with the requests for permission to access Student Services dyslexia records and the university's computer records (see *Appendix 3.4 b*).

Data protection also covered computer access controls. These included computer and file security, involving data coding, encryption, and disk wiping for data removal, while locked filing cabinets with restricted access and the shredding of hardcopies were necessary for paper records. Additional care needed to be taken of recordings, on both minidisk and tape. The measures adopted included password controlled log-on on a stand-alone PC (not part of the RI network) with internet firewall and virus checker. Files were password protected, but as a laptop was not used, encryption was unnecessary. Recordings were kept in locked filing cabinets and a shredder was used for old hardcopies.

Looking at data storage for this study, the student's ID number was considered quite a sensitive identifier, which needed encoding. Therefore, for each participant's RI student number, a research number was generated in a separate file and this was used to ensure that data from different sources or points in time were attributed to the correct participant whilst maintaining anonymity in the database. In this study, the SPSS database included a participant number, even though access was restricted. Case study and interview sample participants were given a short code for ease of reference in the text. Those who were not interviewed were coded as gender, Q (questionnaire), and a sequential reference number within the gender e.g. (MQ1). The references for interviewee quotes consisted of a gender indicator and reference number within gender e.g. (F1), which was also be used to identify any comments quoted from the questionnaires or WAY statements.

4.3.2 Measures and different contact methods

The different contact methods (see *Section 4.2.1*), optional completion of the personality measure and the subsequent selection for interview resulted in reducing sample sizes

during the phases. The differing sample sizes limited the statistics that could be meaningfully applied to the data.

When attracting participants and completing the study measures, a balance was needed between the need for high visibility, which meant advertising the project through public information, versus the requirement of privacy for the participants and non-disclosure to fellow student and friends. A number of strategies were adopted for encouraging engagement with, and participation in, the research, including location of publicity, mode of presentation and timing. For some students, e-mail was found to be the best way to keep contact and arrange meetings, for others the researcher being seen on campus was the trigger.

A few students joined the research as a result of the advertising, by completing the Main Survey. Information outside the dyslexia exam rooms allowed signed consent to be collected from new participants and students whose initial response was by e-mail (see *Appendix 3.4 b.2*). For the majority of participants, the point of entry to the research was either the Main Survey (May 2002) or the Support Survey (Sept 2002) mail-shots (see *Figure 4. 2*). The Support Survey was a 'Quality Review' of Needs Evaluation Assessments (jointly with Student Services), and covered equipment and study support. This was part of the follow-up for some of the students in the main mail-shot. The respondents were then asked whether they would complete the other entry point questionnaire(s) and the Big-5 personality inventory.

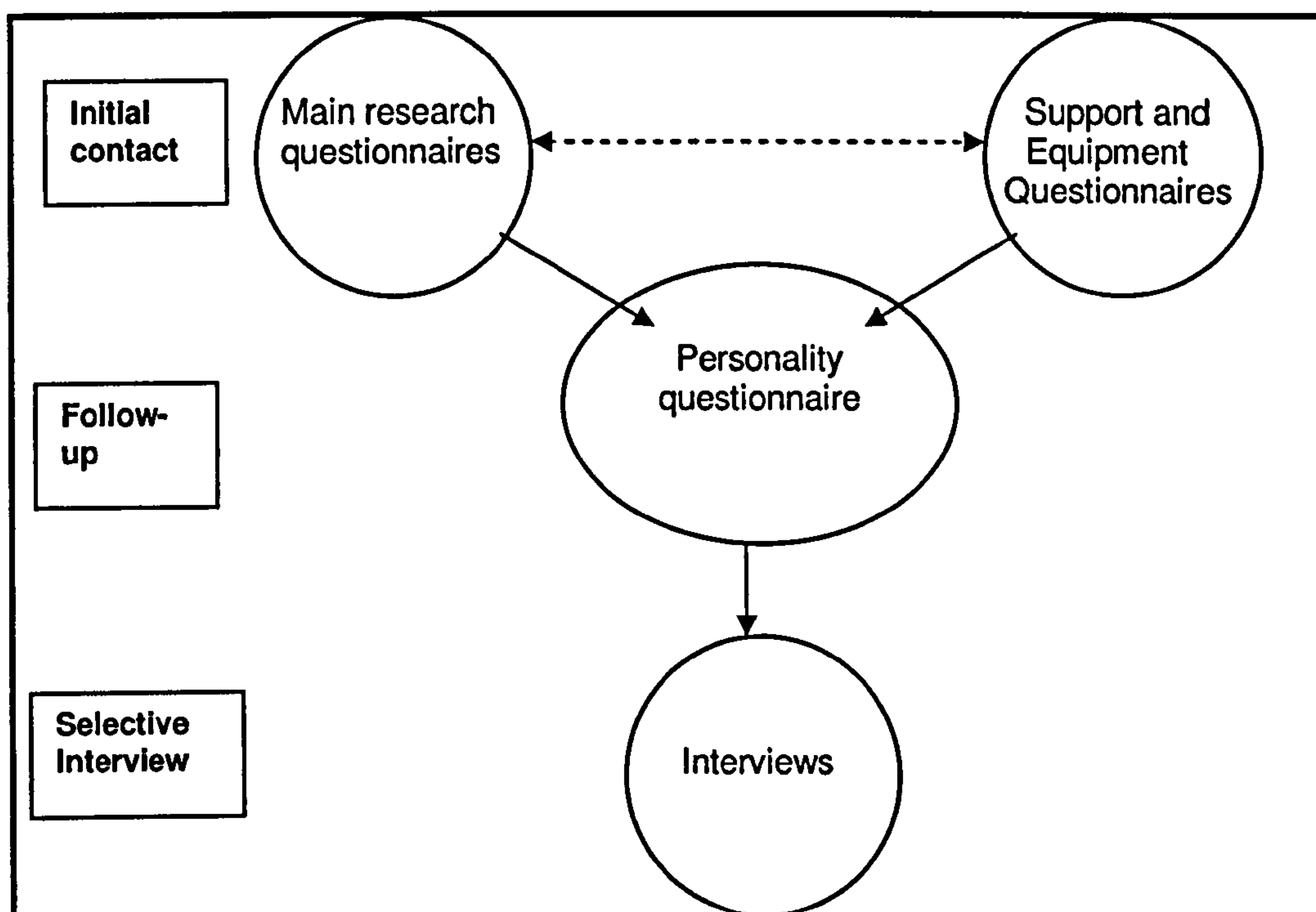


Figure 4. 2 Structure of procedure, alternative entry routes to research

Other means of bringing the research to the attention of the students included a presence during the workshops set up for dyslexic students during Induction Week. All the forms (see *Appendix 3.4 a.1, a.3 and b.2*) and questionnaires (see *Section 3.3.2 – The Questionnaires, Appendix 3.4 c–g, h.1, i.3, j, k and App. 4.1*) were packaged in a distinctive envelope with a reply envelope and given to students after a brief discussion about the research. The envelope helped locate the paperwork at a future date and was easier to remember.

Procedures for following-up and non-response had to be drawn up. Follow-ups and reminders thanked the participants for their permission to access data, and also probed to see if any support might help questionnaire completion. Alternative means of completing questionnaires were offered, including the provision of a reader or scribe, and these were accepted in a few cases. If the task of responding was identified as too challenging, then participants were asked to keep the questionnaires for reference and then complete them face-to-face or by phone. Students were then thanked, and asked if they would participate further by taking part in interviews or completing further questions. The newsletter was used to highlight under-represented groups and encourage participation.

After initial contact, it was hoped to send any outstanding questionnaires to the participants before meeting them, and then to address any issues arising at the interview, making the interview the final point of contact. Ultimately it proved more realistic to provide students with missing paperwork and, if necessary, a reply envelope at the interview. In practice it was only when either their e-mail stopped working or leavers data was reviewed at year end that course transfer or completion became known. The leaving code was the only way of telling whether the participant failed or transferred to another course, unless there was permission to access Personal Information Portal (PIP) information.

4.3.3 Piloting

Focus activity

The research context was an evolving support department, which had a growing need for information about students and the most effective means of support. The technique of a focus group was considered to ensure that the researcher's conjecture about significant factors did not dominate the initial design. Forming a focus group to meet face-to-face proved prohibitively difficult to coordinate, but an alternative strategy of sampling opinion around the campus gave some helpful insights into the issues and experiences of being dyslexic in the RI.

Piloting tools and techniques

Of the 83 students who were e-mailed in June 2000, towards the end of their course, 24 students were involved in piloting. The provisional measures were then selected and piloted before being used face-to-face or for a mail-shot. Thirteen students actively took part in piloting the initial contact paperwork and questionnaires.

The pilot findings showed that the length of the questionnaires was a significant issue, in terms of both number of the sides of paper and the number of questions. It also needed to be clear what each measure was addressing, and to avoid grouping too much information together. The format of the responses and the nature of the questions also led to some difficulties. Designing questions that made sense to students in all fields, without using phrases with subject based connotations or assumptions, required discussion with several students.

Pilot interviews

Pilot interviews in 2000 formed the basis of the subsequent interview prompts (see *Appendix 4.3*). Three final year students took part in an unstructured interview in the last

weeks of the summer term, alone for privacy and freedom of expression. The students, both male and female, were not included in the sample and had varied experience of support at the RI. These interviews were an opportunity to test procedures and the means of recording of interviews.

Certain themes occurred in the interviews, from which prompts were designed to aid capturing more detailed data in the final study (see *Section 3.3.2 –The Questionnaires*). For instance, the pilot interviews indicated great variations in the timeframe over which DSA support and equipment was put in place, and they provided the basis for the response options to the question: '*What were your reasons for entering Higher Education?*'

4.3.4 Phase One: Historic documents – search and logging

Student Services kept some information on students after they had completed their course, but this was refined by Student Services as each year's leavers were logged. As a result the data available was not always the same for every student. For instance, since the 1998 Data Protection Act, earlier files were summarised by year to provide a basis for analysis. For two to three years after completion a reduced file was kept in case the students undertook future studies and details were needed of the support they had received. Ultimately, only Educational Psychologists' reports and Needs Assessments were retained on file for a longer period. In order to standardise the data an Excel form, which covered both the common variables and relevant newer fields on leavers, was developed for this research (see *Section 3.3.2 – Log sheet and Appendix 3.3*). The database was then populated, default values applied, and additional fields generated or calculated (see *App. 4.2–App. 4.5*). The fields included the student's age when starting the course, gender, nature of course, type of reason for contacting the support team, leaving code and a deduced research group. The entered data needed verification and validity checks carried out in SPSS. The design for Phase One indicated a need to develop a model of the sample wanted for Phase Two before trying to develop institution-specific questionnaires. SPSS statistics would then be used to describe the population.

The historic Leavers' data allowed for some analysis of dyslexia support trends over a 10-year period. Descriptive statistics were calculated from the data for past students covering gender, age group, field of study and support contacts during a course. The period available was not the same for all variables.

Analysing past demand and trends using the Student Services summarised Leavers’ data had three possible uses: to describe the existing population trends; to look at the potential accuracy of predicting future numbers; and finally to identify a representative sample for the final phase.

The Student Services’ data became more detailed over time. In early cases the student’s age group was shown by a tick box for under-25 or 25 years and over; later, information on date of birth or age at the start of the course was gathered. Where possible, information about the age when university support was first used was also gathered. Frequency of visits and reasons for visits to Student Services were noted in increasing detail.

The differences between the date of entry to university and the time when the student made contact with dyslexia support in Student Services, as well as the reasons given for contacting the support team were the basis for considering which research group a student belonged. Decisions were made based on certain assumptions (see *Table 4. 1*). In Phase Two of the research initial research group information was directly collected as part of the questionnaires instead.

A student who	Group
did not need a new or updated report – grouped based on contact date	<i>In</i> A, B or D
underwent initial screening (first assessment) while in Higher Education	<i>In</i> C
was not 'known' to Student Services in the first term of the course	<i>Not</i> A
needed an updated report and made contact in the first term	<i>In</i> B
needed an updated report and did not make contact in the first term	<i>In</i> D

Table 4. 1 Research group criteria for Leavers' data

The data was reviewed for validity (appropriate form type for processing and within acceptable boundaries) by checking for: end dates later than start dates; age at entry to RI at least 16 years old; start of course, default deduced from the first two digits of the student’s identification number, if it was not available.

As part of the data gathering from Student Services, the course start and actual end dates from Leavers’ data, were used to generate a 1st September date for each academic year a student was enrolled at the RI. This gave the academic year that formed the students first year, second year, and third year study going on until the actual leaving date was reached. No attempt was made to exclude placements. For the total of dyslexic students present in September of any year, tallies of occurrences of that academic year were used to calculate

annual totals. Due to varying course lengths the annual totals, were incomplete for at least the last 3 years of data. The same annual tally method was applied to years in the support system, using the date a student became 'known' and were considered be supported, and the leaving date. Some students went beyond simple acceptance of exam and marking arrangements to be actively involved in support sessions.

Most participants in Phase Two gave permission for the researcher to review their Student Service records relating to their dyslexia, which showed the timing and quantity of support used. Most also gave permission for access to PIP pages, which showed scaled interval data for module results as well as ordinal categories such as degree class.

4.3.5 Phase Two: Data surveys

By providing envelopes containing a full set of questionnaires (see *Section 3.3.2 – Main Survey*), administration documents (Information and Consent forms) and a stamped reply envelope for use with address labels from Student Services, anonymity was protected during survey mail-shots.

The Main Survey

In Phase Two, the data gathering design channelled the two survey entry routes together when many respondents went on complete the Personality Inventory. They were also asked to complete questionnaires for the 'alternative' entry route where possible. In this research, many participants felt comfortable adding notes to the questionnaires to explain their situation, or in cases where closed questions did not fit their personal perception of the situation – a behaviour supported by Farmer *et al.* (2002, p. 69).

As part of the main survey, the 15 Who-Are-You (WAY) statements 'pushed' most students beyond 'pat' answers (see *Section 3.3.2 g*). Some participants found it difficult to provide a sufficient number of responses. Two people completed it twice, at least six months apart.

Participants received VARK as part of the main pack (see *Section 3.3.2 h*). Using this questionnaire as a postal survey raised the issues of the lack of opportunity to emphasise that more than one selection could be made per question. The participants totalled their own responses as Visual, Auditory, Read/write, and Kinaesthetic. There was no further information on interpreting the results available to participants at that stage. The

spreadsheet for scoring was provided by Fleming, one of the designers. The VARK data was entered, scored, and the appropriate information sheet sent out to participants, giving feedback on their Learning Styles and study strategies, which might be of benefit to them.

Where permission had been given, to access the Educational Psychologists reports filed with Student Services, scores for intelligence, including WAIS and Wide Range Achievement Test (WRAT) were gathered. WAIS and WRAT were administered by a third party (the former by a psychologist), whereas the other measures used in this research were self-administered (see *Section 3.3.2 i*). In the WAIS tests one would expect indices within the verbal and performance IQs to correspond and correlate positively. The WAIS-III sub-tests address the ability to store, access, and process information. Particular attention was given to the indices standard score data for WAIS-III. The maximum standard score was 150 and the mid-point 100 for each index, regardless of gender.

The MI questionnaire was part of the Main Survey. Each section was completed by placing '1' by every applicable statement. The score for each intelligence were calculated by totalling the responses to 10 questions. A number of students followed the instructions for scoring and plotting their own intelligence profile.

Personality

Students were asked if they would complete a further questionnaire before being sent the personality questionnaire. To score this measure the Likert scale response was converted to a number value, 0-4 (see *Section 3.3.2 – Personality Survey*), in Excel using large scale edits. Excel functions were used to sum the domain totals for each participant, and then retrieve the *T*-scores from a separate sheet. The domain totals were read off a *T*-score chart in Excel to accommodate gender differences (see *Appendix 6.2.7 – T-score conversion table*). Participants did not receive feedback from this measure.

Support

The Support Survey mail-shot consisted of a covering letter and two questionnaires (see *Section 3.3.2 – Support Survey*). Those who returned these measures were thanked and asked if they would participate in further research. The results were entered into an Excel spreadsheet and subsequently imported into the SPSS database for analysis.

4.3.6 Phase Three: Interviews

Phase Three consisted of interviews, which were mostly face-to face, but some by telephone. The representative sample targets were used to follow-up promises of an interview to give a better range of participants. The interview was arranged for an hour, at a location acceptable to the student, usually in quiet surroundings with no one else in the room.

Having thanked the participant for coming, they were asked permission to record the interview and any questions they had were answered. It was explained that the prompt sheet was there to ensure that the main topics were covered (see *Appendix 4.3*). The interview began with establishing the stage at which dyslexia was first recognised. From this point, it was possible to ask about experiences of compulsory education in light of either known or unrecognised dyslexia. Where the student's responses flowed on, very little attempt was made to direct the interview, except to ensure that all periods of education, activities and information about how the participant saw him or her self as a learner were considered. The prompts were needed for a few students either who had either blocked out memories of education, such as experiences prior to dyslexia being recognised or a change in school, or for those who gave very concise answers and needed help to expand their responses. Occasionally points of particular interest were noted on the prompt sheet for ease of access prior to transcription. On completion, the participant was asked if there was anything they wanted to add about their dyslexia and/or their study in HE. Finally, they were reminded that they did have the right to withdraw from the study at any time, thanked and offered compensation for their time (see *Section 4.3.1*).

4.4 Analysis

In addition to the log-sheet (see *App 3.2*) the data was built up as it was coded and formats converted for calculations or analysis. Analysis of gathered and generated fields (see *Section 3.3.1, App. 4.2–App. 4.5*) was undertaken including both numerical and text analysis. To establish how many dyslexic students were present in the RI in a year from the Leavers' data, calculations using academic year values (see *Section 4.3.4*) were used. Year totals for students generated this way were definitely incomplete for those who started in or after 2001/02, as not all that cohort had left by 2004, and would not be counted until they had left.

4.4.1 Software

The software used included MS Word and Excel 2003, SPSS v12 (v15) and NVivo v. 1.3. NVivo allows the coding of themes in text in the form of nodes, which can be given attributes and structured into sets. In SPSS, a number of approaches to cluster analysis are available, namely: Two-step; K-mean (optimisation, Quick cluster); Hierarchical. The Hierarchical cluster techniques handle grouping by either case or variable (see *Appendix 4.4 - SPSS database*).

Text Analysis

The recorded interviews were transcribed and then content analysis was applied using NVivo software. The text from open questions or comments, and WAY statements (part of the main survey) was also analysed. Where quotes from dyslexic students were used, especially from open question responses to questionnaires, they were not corrected, the intention being to give a picture of the dyslexic issues experienced on a daily basis in HE.

The texts were analysed for themes and any related extracts of text were linked to a node for that theme (see *Appendix 4.5 - NVivo data structures* and *Sections 8.2.1* and *8.2.2*). Nodes were extracted from interview transcripts (see *App. 4.7*) and from WAY statements (see *App. 4.8*, and *Section 7.2 - Who Are You* for use of sets 'Study' and 'Experience of university life'). The initial expectations for theme nodes from the interviews were based on the prompts. The process of content analysis was iterative, involving repeated reading of the transcripts, creation of nodes and themes, followed by reviews. The challenge was keeping the same nuance to node definitions during different passes, unless they were being refined and some text re-associated to other nodes. The interview nodes were consolidated in excel down to 11 main theme groups or sets (see *App. 4.6*) within three top level groups: Cognitive skills; Experience; and Self/Personality. Others, including my supervisors, reviewed several cases of interview analysis and nodes for completeness and researcher bias.

These nodes did not necessarily indicate whether they were of a positive or negative nature. Any single response statement could potentially be relevant, in total or in part, to more than one node or theme. Analysis was an iterative process, with sections of text being reclassified as new nodes arose from analysis of further texts. Subsequently nodes were grouped into sets relating to an aspect of analysis such as experience of university life or dyslexia in the family.

The WAY responses ranged from being objective in nature (factual, observable information) and requiring no introspection, to being subjective (self-awareness of internal and unobservable concerns and qualities). The interviews gave an insight into the participants' perceptions of their academic experience and the family response to dyslexia. Themes arising from the use of NVIVO included dyslexia and identification, achievements, confidence, strategies, cognitive skills, and study issues at university.

Interviews and WAY statements were analysed using descriptive statistics, which looked at the frequency of response themes and topics. The results were analytical, not an attempt to label individuals.

4.4.2 Statistical analysis

Given the opportunistic approach to data gathering, many students did not complete all the questionnaires, and only a restricted number were approached to undertake interviews. Further, some questions were by-passed as a result of other answers, hence within any one measure, the sample size varies between questions. As a result, a filter using the presence of key fields was established for each measure in order to give a consistent sample size. For details of statistics used in this research, see *Section 3.2.3* and Field (2005), Pallant (2005), and Miller *et al.* (2002).

4.5 Summary

This chapter has provided a detailed account of the approach to the samples and data collection. Chapter 5 considers the Leavers' data derived from support services documentation. It is mainly concerned with the nature of the dyslexic population in the RI and the wider HE sector. It discusses how representative the sample was and includes analysis of the samples for each measure used in this research (see *Table 5. 9*). The main data is described and analysed in Chapters 6, 7, and 8.

Chapter 5 – Analysis of Historic Data

5.1 Introduction

This chapter reviews the document-based research findings derived from the research institution's (RI's) data on leavers in light of national figures from the Higher Education Statistics Agency (HESA) (see *Appendix 5.1*), and the Universities and Colleges Admissions Services (UCAS). Specific details were also available from the RI data returns to HESA and other documents. In addition, it was possible to access data gathered in Student Services, which were derived from contacts relating to dyslexia, in an anonymous form, for students who had left the institution. The historic data relating to leavers was not collected in a static environment, but rather one influenced by changing government policy, in which university provision was evolving.

This investigation of the 'historic' data looks into trends of support use, and reflects on the impact of changes in legislation and government policy. The main focus of the analysis is to identify trends in gender ratios, age-groups and the number of students who were first formally assessed for dyslexia at university. The trends are viewed in light of support developments within compulsory education. This data formed the basis for establishing a representative sample of interviews for Phase Three of the research (see *Section 5.5*). It was anticipated that delays in identification combined with the age and gender of the student could be factors influencing the use of support. The data gathered also covered fields of study, a summary of the use of support provisions, and where possible an indication of the frequency of support contacts and the course outcome.

5.1.1 Statistics from External agencies

To examine the status of the 'total' UK HE student population, as well as the national dyslexic HE student population, it was necessary to consult two sources, HESA and UCAS. The purpose of using statistics from external agencies was to consider whether wider participation in HE was being achieved. There are a number of limitations on the accuracy of the data from HESA and UCAS (Richardson and Wydell, 2003), and the RI. Firstly, students were not obliged to disclose a disability or DSA to their university (UCAS, 1997 – discouraged declaration if no support was needed) cited by Richardson and Wydell (2003); secondly, not all institutions returned disability figures to HESA, and thirdly, students with multiple disabilities could not be identified as part of the dyslexic cohort, even if this was appropriate.

The HESA disability figures used were based on numbers of first-year UK students on 1st December of each year. As a 'snapshot', they may not have been complete due to the recognition and registration process, and delays in passing information between departments. Little age related information was available from the HESA data. For UCAS, age data was based on the 30th September of the year of entry. The UCAS figures covered students who applied to and were accepted by institutions, but may not have actually started the course. It should be noted that HESA usually included Open University (OU) students, which the UCAS data did not, the significance being that the OU has both large numbers of students and, because of the distance-learning format, a higher proportion of disabled students. The numbers for disabled students in the HE student population as a whole, where available, were also reviewed taking account of the fact that disability figures usually related to first-year students (see *Section 2.4.1* for dyslexia figures). Factors that might have influenced the number of dyslexic students at an HEI included the range of courses offered and the degree of support available within a specific institution. Students not recognised as dyslexic until starting university study are not fully represented in HESA data due to the cut-off date.

5.1.2 Review of the Dyslexic Population in the Research Institution

The historic data related to those dyslexic students who had left the RI. This data was provided by Student Services' Dyslexia Support team and the Student Administration and Systems Department. There was minimal Leavers' data for the 30 students who had started between 1988 and 1990/91, because, due to the subsequent introduction of a new student identification system, earlier students were not accessible in the Student Administration system (see *Sections 4.2.2*, and *Section 5.2.1*, and *Table 5.1*).

Prior to Oct 2000, when the study started, there was historic data for 707 past students. It was considered in two parts. A 10 year period of leavers (1992-2001) provided representative data, giving cases which recorded gender, age group at start of course and some course details (N=857). This data informed research design decisions and formed the basis for the interview sample for Phase Three. The remainder covered students who left during the research, some of who were participants. At the end of the research in July 2004, 289 dyslexic students were leaving, of which the records showed that 157 were female and 122 male, with the remainder unknown. In total the SPSS database for this research had 1655 cases with historic data and a further 64 participants who had not left by the end of the research (see *App. 5.36*).

5.2 Dyslexic Student Population

The features considered as the basis for the representative sample – gender, age, course and age when dyslexia was recognised – formed the basis of the analysis of national and RI data for leavers. A paper that derives from this chapter was presented at the British Dyslexia Association Conference at Warwick on 28th March 2004 and is accessible from the conference CD (Eld, 2004).

5.2.1 Growth Rates

HESA totals, for all first-year students, at all levels of study including postgraduates, between 1994/95-2003/04 showed an overall trend of 45% growth over 10 years, although the growth stalled on a number of occasions (see *Figure 5.1* and *Appendix 5.1.1* for a breakdown of dyslexic data).

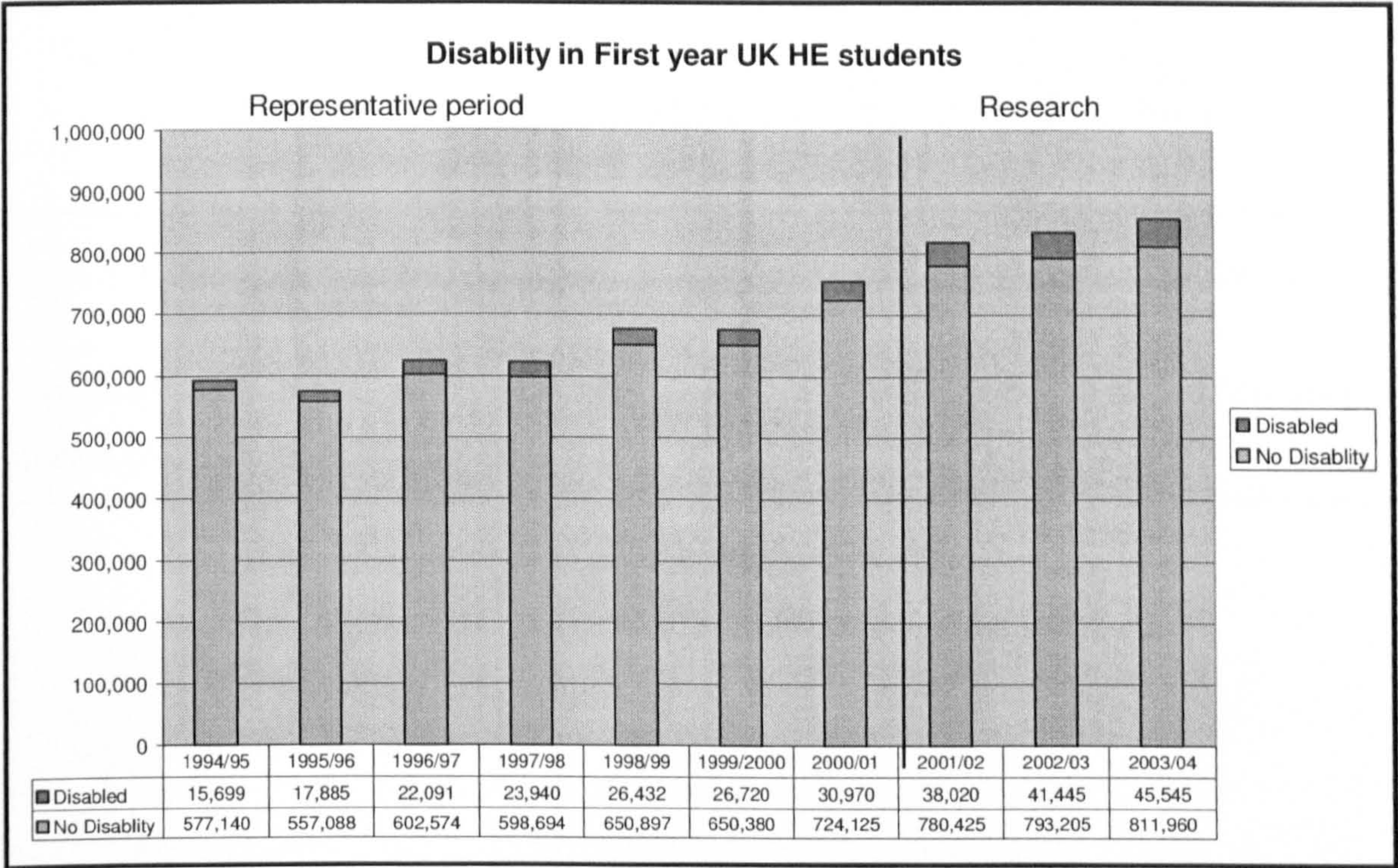


Figure 5. 1 Ratio of disabled students, for all UK students in their first year 1994/95-2003/04 [HESA, Disability]

A more detailed breakdown of the figures for undergraduate students indicated that the disabled student population showed continuous growth between 1994 and 2004 (see *Figure 5.2* and *App. 5.2* for dyslexia as percentage of disabilities). The numbers had noticeably grown by the end of this period, represented by a percentage rise from 3.1% to 5.3% of the increasing total student body. Dyslexic students showed a five-fold increase in numbers, to 2.3% of first-year UK HE students. This means that growth in dyslexic numbers accounted for almost all the growth in disabled student figures since 1996.

Support services, nationally, were officially assisting 2,359 dyslexic students in 1994 (see *App. 5.3*). By 2003, there were 18,700 disclosed dyslexic students in HE.

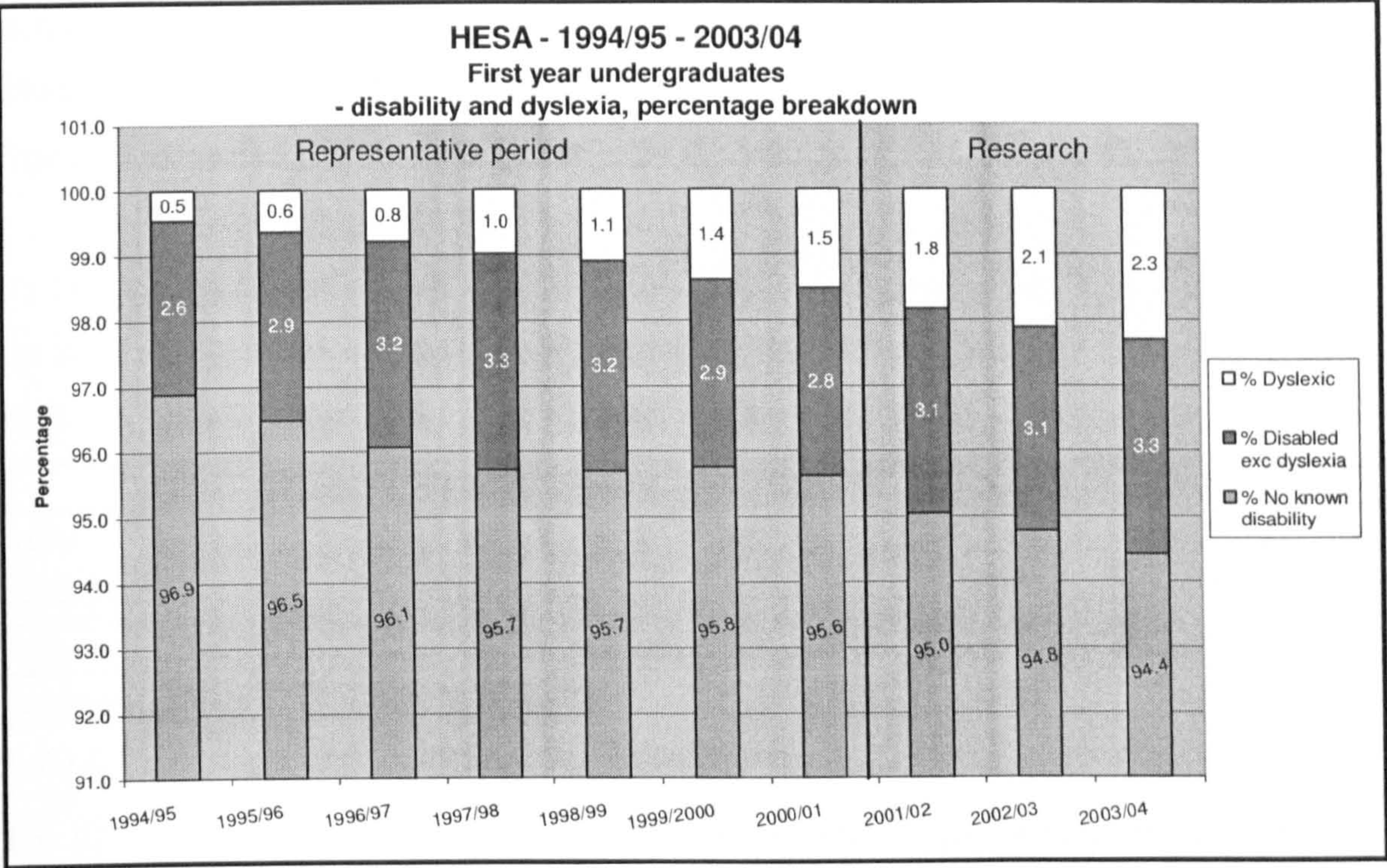


Figure 5. 2 Undergraduate first-year students; disability and dyslexia, as percentages 1994/95-2003/04 [HESA, Disability]

The dyslexic group size, within disabled students, rose from 15% to 41% of the first-year student population (see *Figure 5.3* and *App. 5.3*).

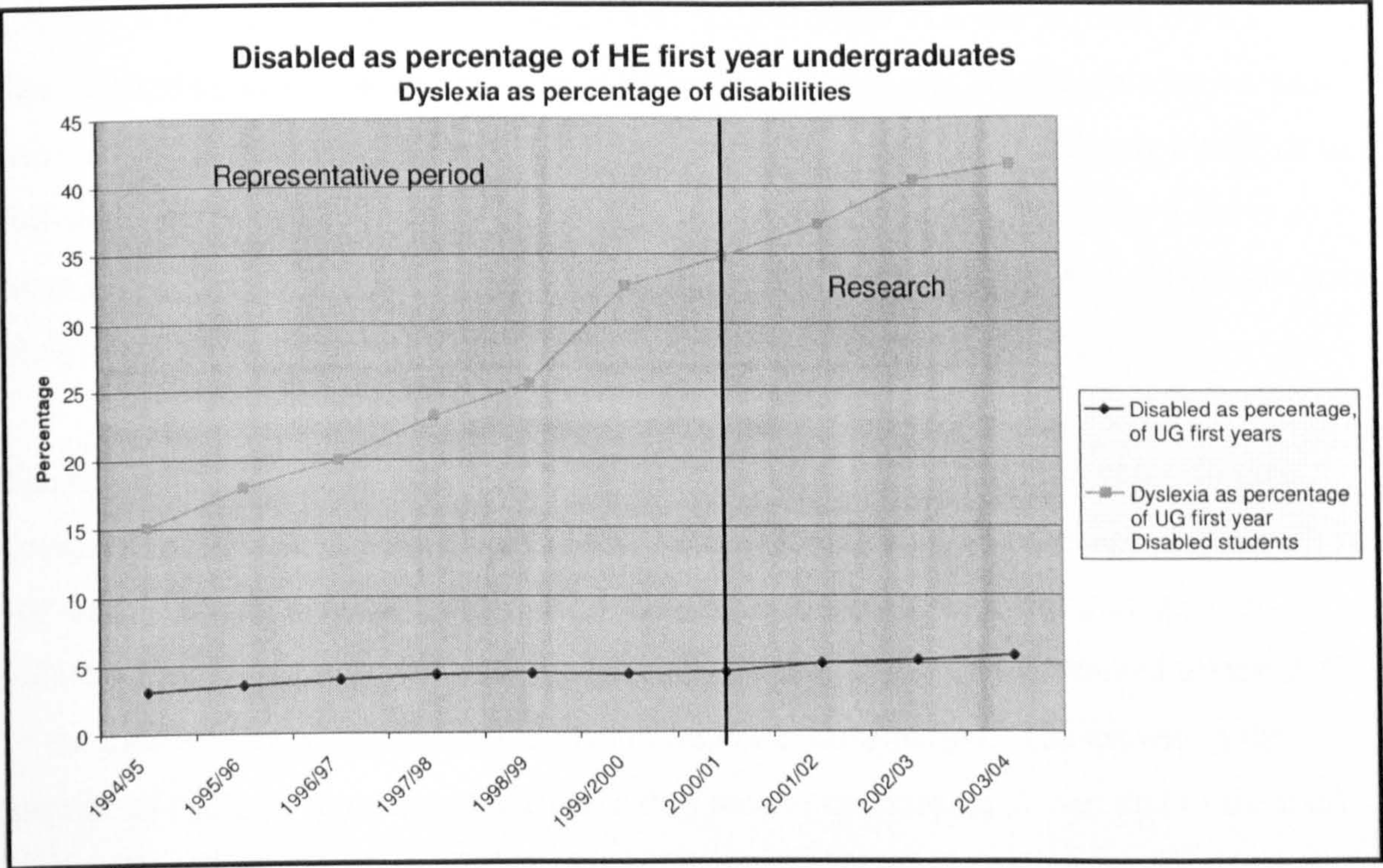


Figure 5. 3 Growth of dyslexia in the disabled student first-year undergraduate population and of the disabled students population 1994/95-2003/04 [HESA, Disability]

Care had to be taken during the analysis to ensure that overseas students were not included in RI – HESA institution data totals for comparisons using HESA disabled students data, as that related only to first-year UK domiciled HE students. To achieve a total number of disabled or dyslexic students for all years a three-year rolling total, accumulating first-year figures, was used.

By looking at Leavers’ data, it is possible to estimate the number of dyslexic students at the RI in any year, prior to the start of returns to HESA relating to dyslexic students (see *Table 5.1*). In 1992, seven dyslexic students left according to Leavers’ data (see *App. 5.4*).

	1988/89	1989/90	1990/91	1991/92	1992/93	1993/94
Male	4	6	12	41	62	93
Female	2	5	18	52	88	94
Dyslexic Total	6	11	30	93	150	187
Leavers				-7	-46	-27

Table 5. 1 Early dyslexia frequency for RI 1988/89-1993/94

The RI was, on average, 15% larger than the mean size for English Universities, according to HESA’s returns for the academic years 1995/96-2003/04. Being a larger institution meant that a greater number of disabled students needed to apply in order to match the trends seen in smaller establishments. HESA returns related to those in receipt of DSAs by December. The HESA return figure for dyslexic students at the RI in the academic year 1994-95 was 145 (see *App. 5.5* for details and Student Services totals derived from Leaver’s data), which was likely to be an under representation as student permission was needed for the data to be returned. DSA was originally means tested and only available to full-time undergraduates thereby excluding some people recognised by Student Services from HESA figures. By 1999/2000 it had risen to 447, and by 2004 to 814. Initial analysis of dyslexic student numbers therefore indicated steadily increasing numbers.

The national first-year students’ dyslexia data was accumulated for three years, to give comparative figures for the available RI data for all students, in all years and at all levels of HE study. The national data showed 2.5% of the total student population as dyslexic, in 2003/04 (see *Figure 5.4*), while the RI data showed that dyslexics represented almost 5.6% of the total student population in the institution in the same period. The growth in the number of dyslexic students at the RI was thus seen to be more rapid than that of the total student numbers, and substantially exceeded national expansion rates.

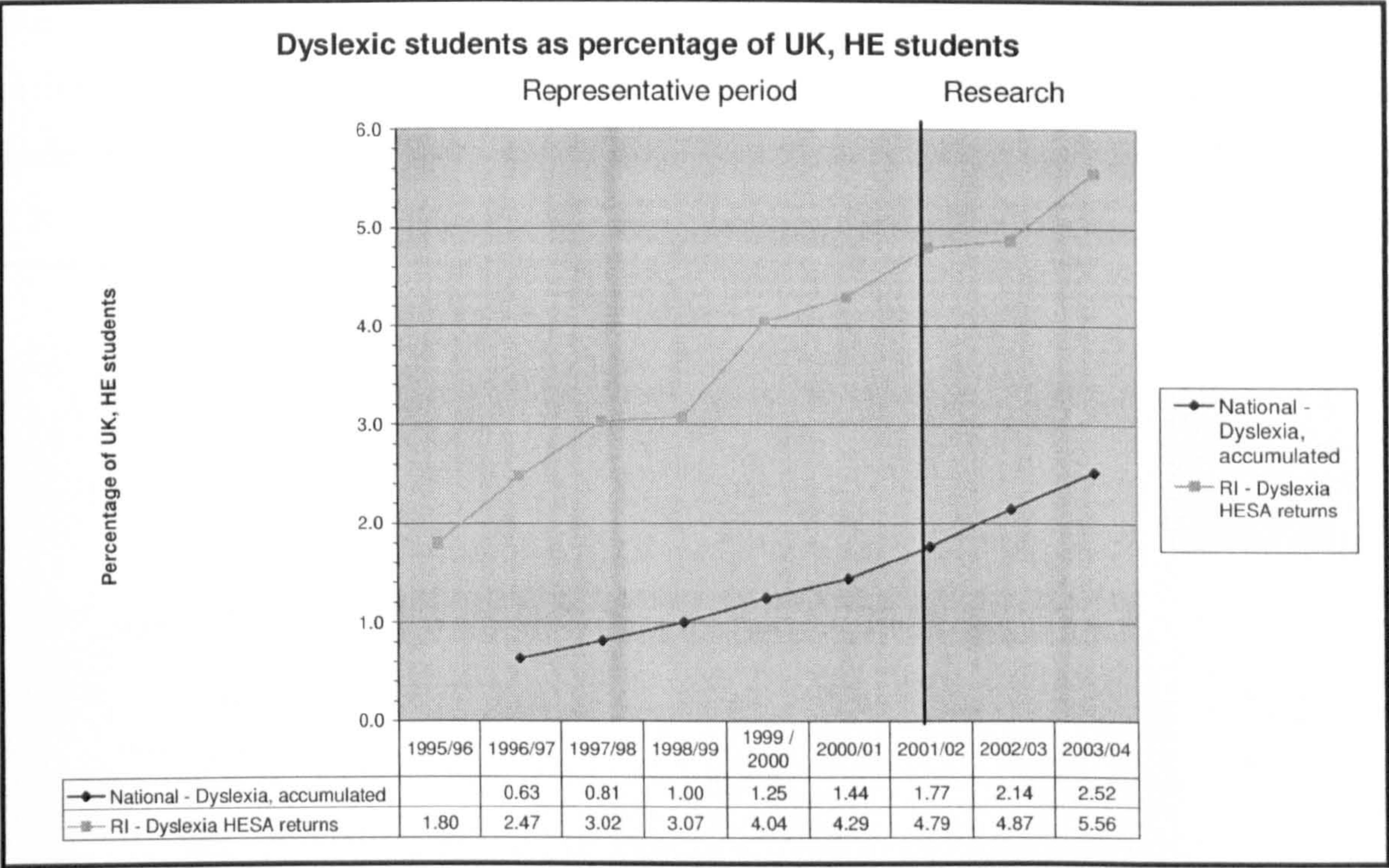


Figure 5. 4 Growth in dyslexic student numbers, nationally and in the RI, as percentage of all UK, HE student, 1995/96-2003/04 [HESA, Disability; RI Returns]

The greatest percentage growth in the HE student population, nationally, was shown by dyslexic students (see *Figure 5.5*). The growth rate was more pronounced in the RI data (see *Figure 6.6* for details).

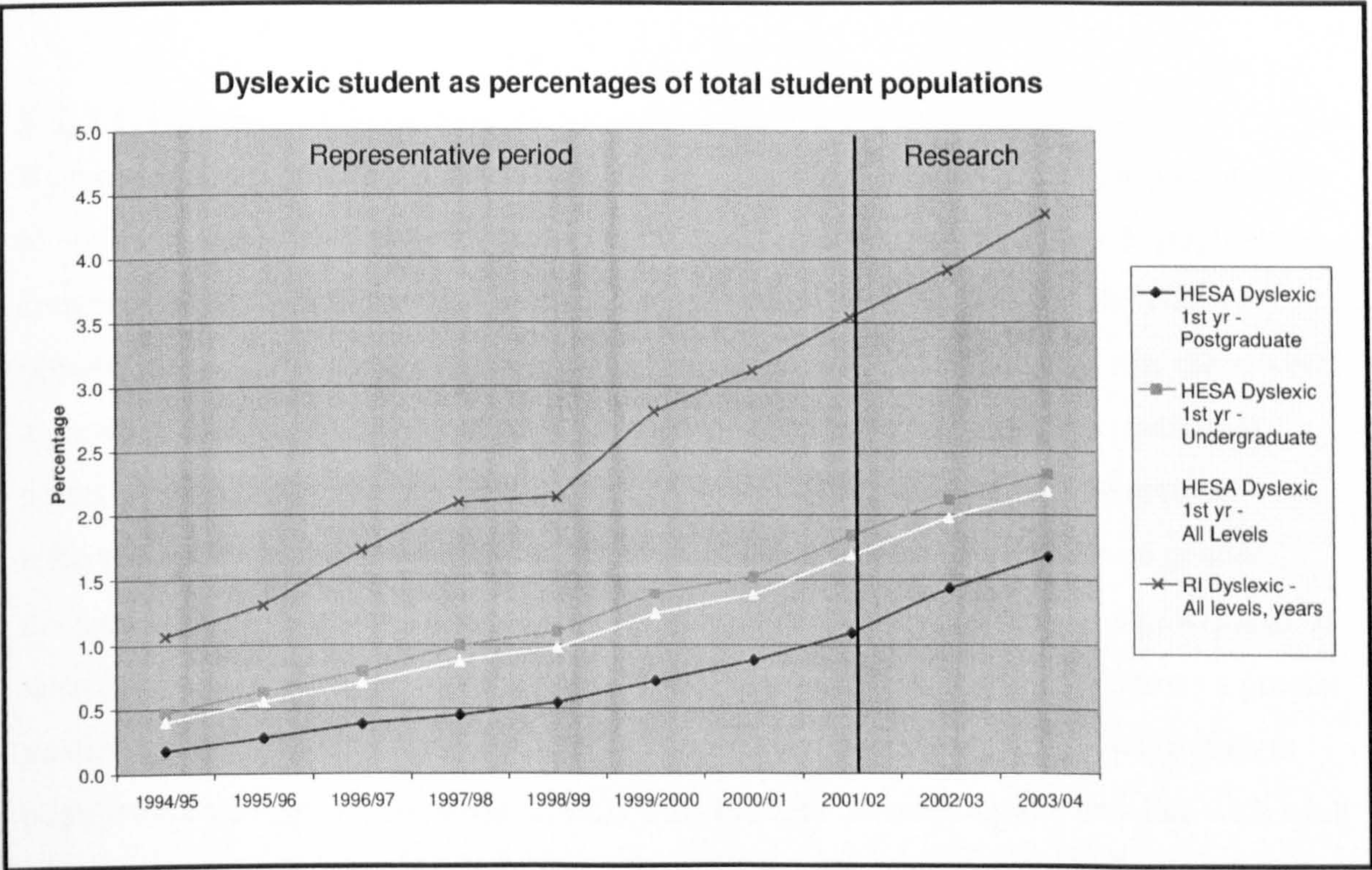


Figure 5. 5 Growth of dyslexic student percentages, national and RI, 1994/95-2003/04 [HESA, Disability; RI returns]

The data reported here were extracted from the figures returned to HESA in December each year, as these included a breakdown, which showed the proportion of dyslexic students (see *Figure 5.6*). These data relate to the national data in *Figure 5.1* and *Figure 5.2*.

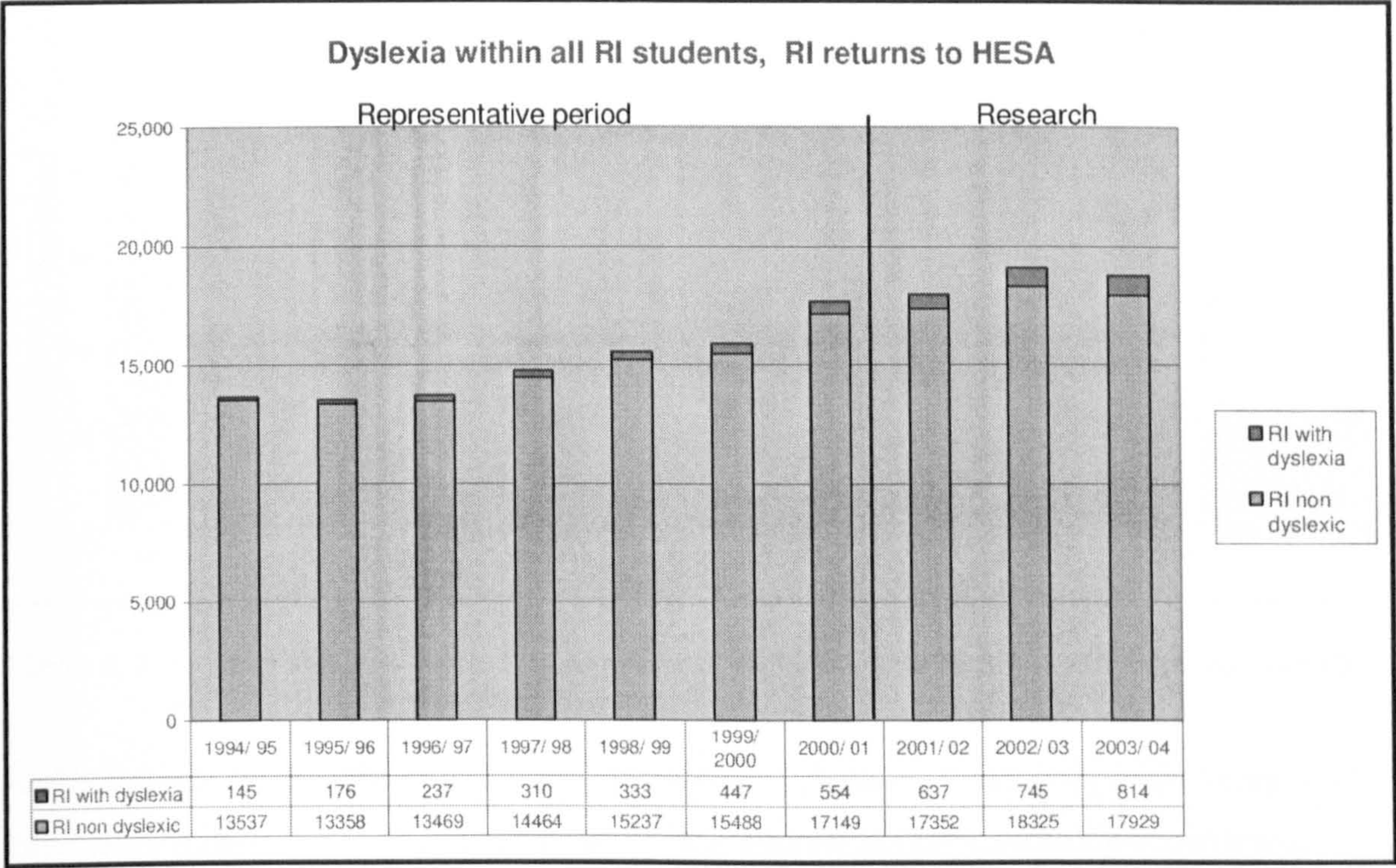


Figure 5. 6 RI growth including dyslexia data 1994/95-2000/01 and 2001/02-2003/04 [RI Returns]

5.2.2 Gender

By looking at the population as a whole and also at national student trends, it was possible to put the dyslexic student gender ratios in context. In 2001, although the UK population consisted of 48.6% male to 51.4% female, for the academic year 2000/01 the HE population had 59% women students. The census figures (2001) indicated that there were a growing number of adolescent boys, as opposed to girls, moving into the traditional potential university intake age group of 16-24 years. This factor did not seem to be reflected in the student gender ratios. There was a shift from a relatively even gender division within UK undergraduates, favouring females by 6%, to a ratio of 59 : 41, female : male (18% more women), over the period 1995/96 to 2003/04. *Figure 5.7* shows a greater percentage of female UK students in HEIs nationally year on year, in a growing student population (see *App. 5.6* for frequencies). This brought national figures into line with what was already being seen at the RI, a ratio of three women to two men (see *Figure 5.7* and *App. 5.7*). The RI women already formed almost 59% of the student population as early as 1995/96, and the level continued to fluctuate around 60%.

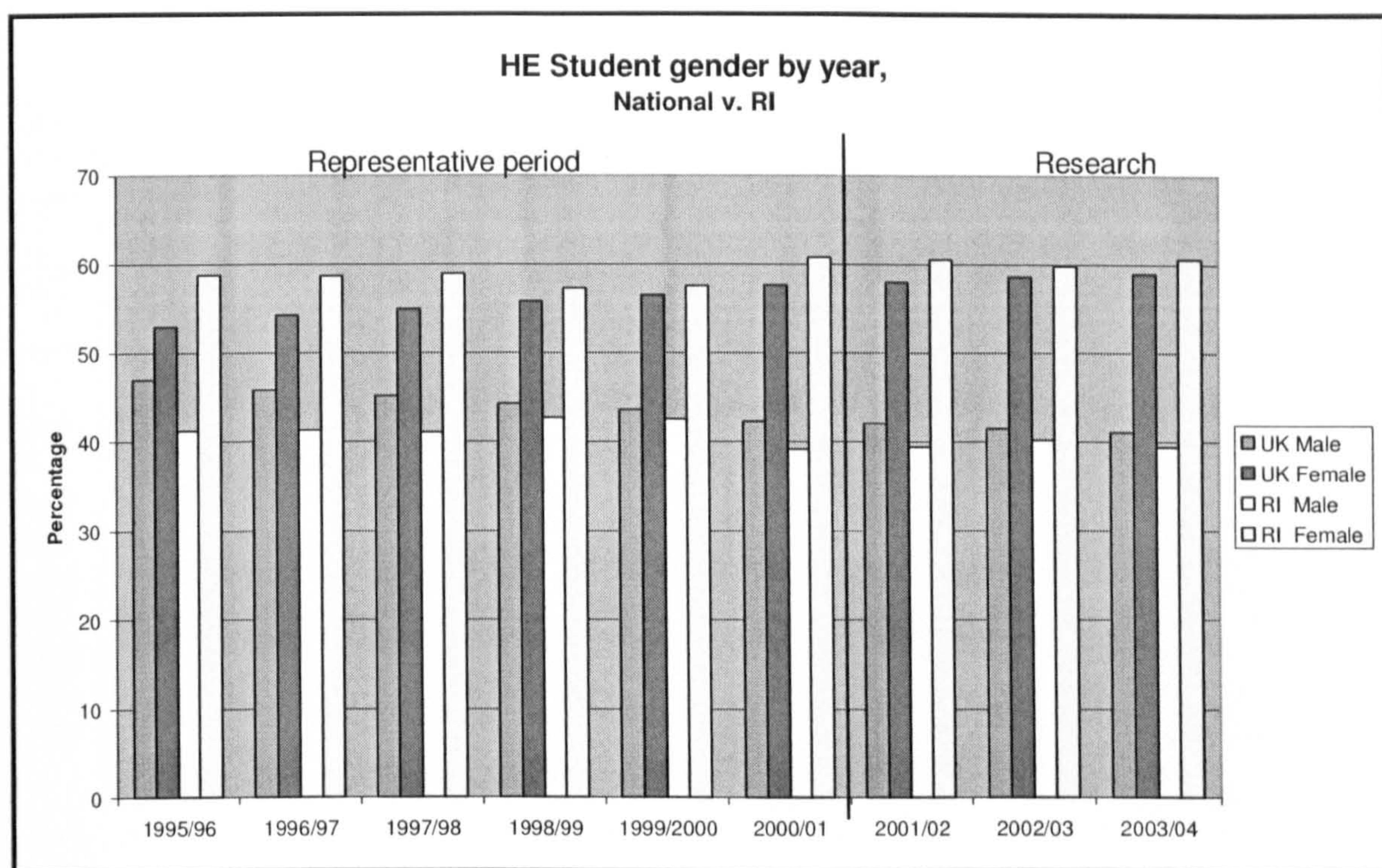


Figure 5. 7 National and RI gender ratio, as percentages, HESA data for UK undergraduates 1995/96-2003/04 [HESA, Institution; RI Returns]

In the national figures the growth ratio averaged 4:1 (female : male) over eight years, with later years showing 3:1. The gender ratio of the undergraduate population growth was twice as great, in the already larger, female population at the RI. Factors such as the earlier development of literacy skills by girls, and its effect on A-level results, may have led to the increased numbers of female students, but the census also shows marginally more women in the whole population. The impact of the growth in the ratio of male to female in the adolescent population, seen in the census figures, would be diminished in the student population, because the age range of the intake was not solely 18-24 year olds.

In the population at large, it has been reported frequently that about one in 10 children have dyslexia, and the occurrence of dyslexia in males, compared to females, might be as great as 4:1, although this has been strongly contested in recent years (see *Section 2.2.1 – Age at identification and gender*). The data reported here supports those who feel that there are near equal numbers (see *Figure 5.8*). The predominant gender in the dyslexic first year population is reversed (male dominated), by comparison with the national undergraduate population (see *Figure 5.7*). Within the dyslexic undergraduate first year population (see *Figure 5.8*), the percentage of women increased from 36% to 49% in the period 1994-2004, which might reflect improvements in recognition of dyslexia in women at school. The RI the dyslexic population in any year, unlike the national situation, was not always male dominated.

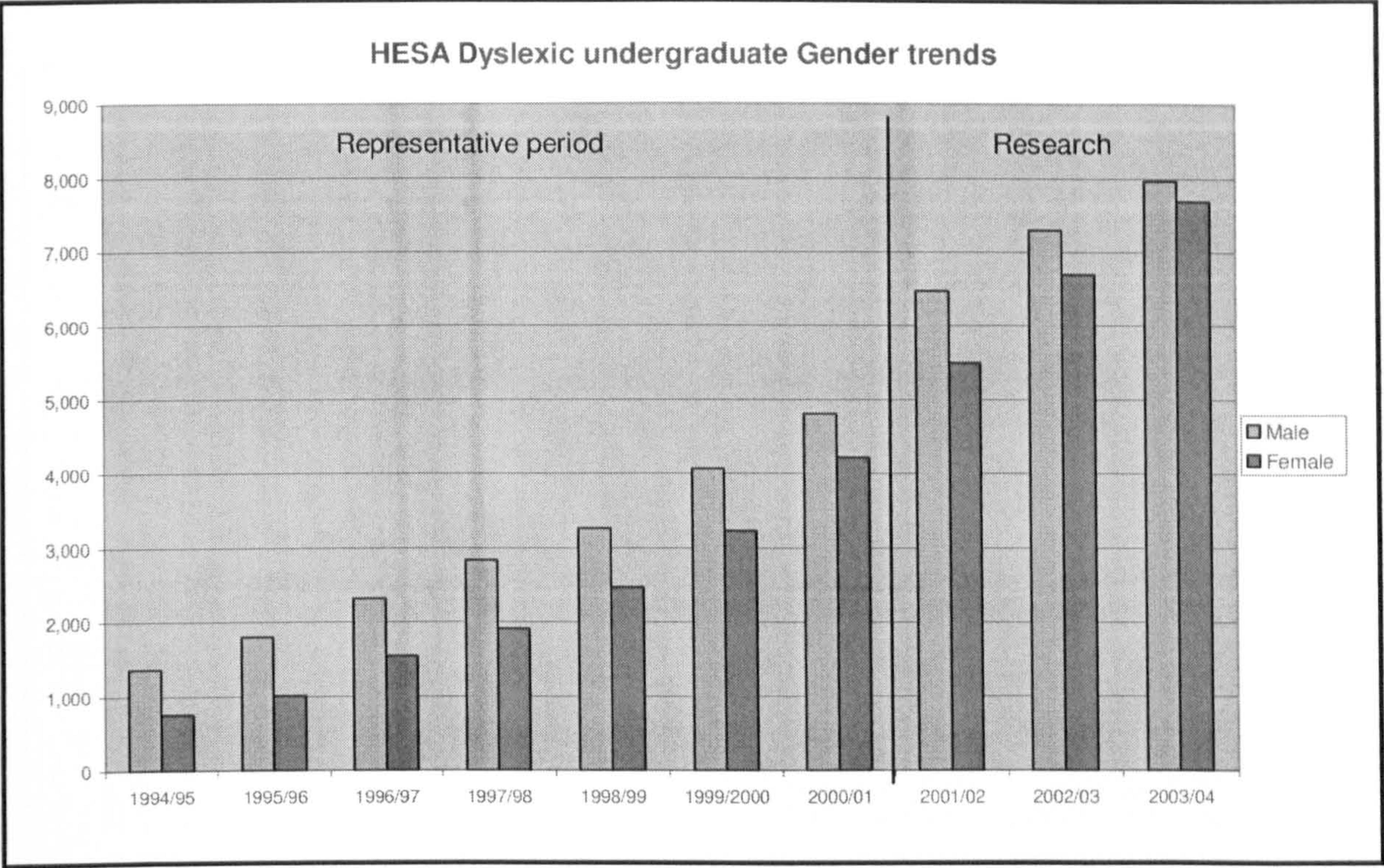


Figure 5. 8 Dyslexic undergraduate first-year UK students, by gender, 1994/95-2003/04 [HESA, Disability]

The total HE population neither reflects the gender ratio of the population at large, nor that of a single age group, and this prevents the development of a conclusive view on the role of school support in increasing male dyslexic applicants to HE or changes in female dyslexia recognition. *Figure 5.9* shows the rate of growth and the fluctuation in gender of the RI dyslexic leavers' population for all students present for an academic year. Although covering a longer time span, this relates to the national data in *Figure 5.8*.

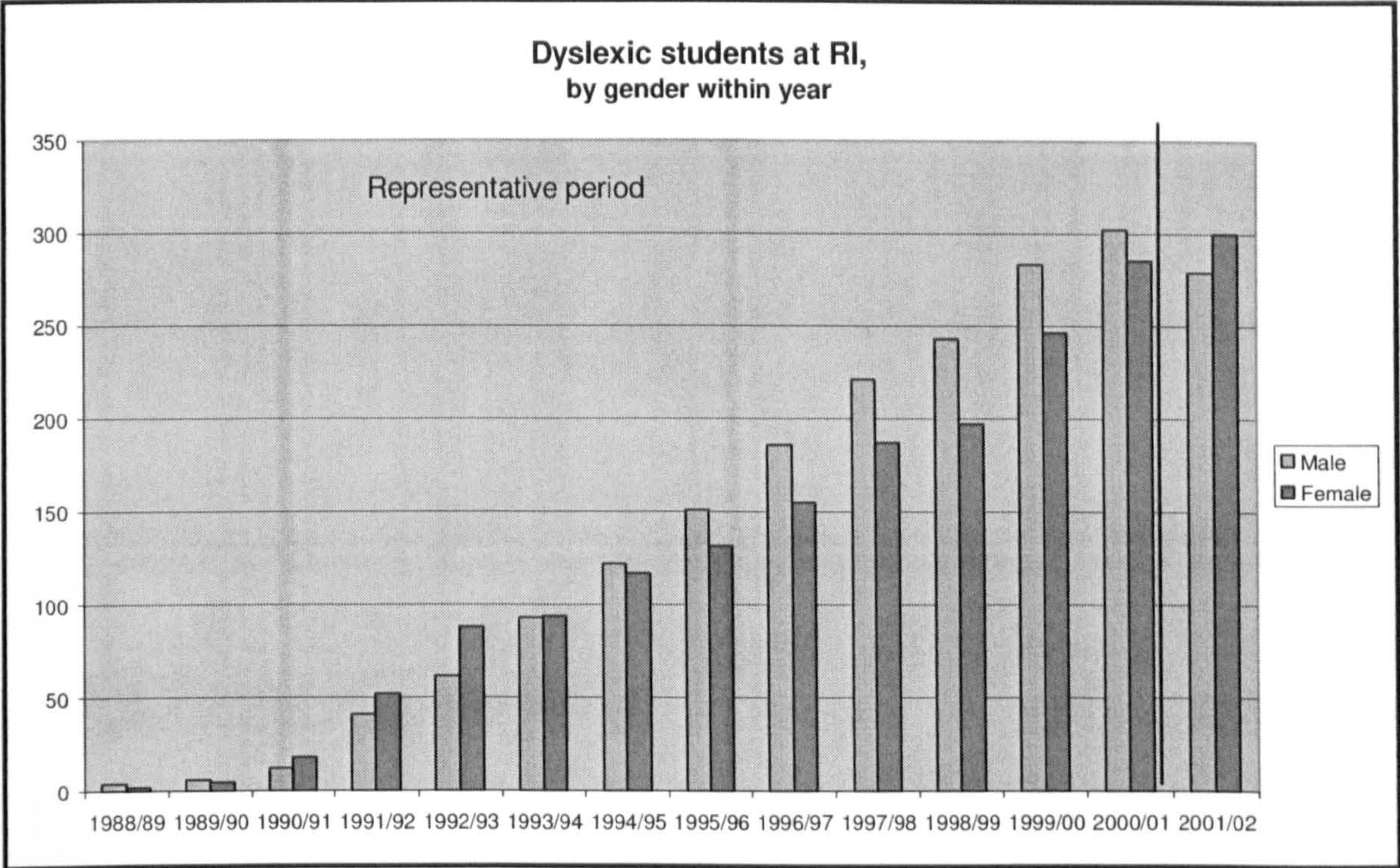


Figure 5. 9 Findings for Dyslexic students at the RI by year and gender, 1988/89-2001/02 [Leavers]

In the analysis of the data, consideration was given to whether legislation changes had an immediate impact or took time to come through. The DSA was introduced in the academic year 1989/90 and the first part-time member of staff was employed to offer dyslexia support groups in May 1991. The impact of the DSA may account for the rise to 43 students registered as dyslexic with Student Services in 1991. A further 15 were known but did not have registered status by early 1991. The addition of a member of staff with responsibility for dyslexia support resulted in increased recognition and use of the DSA, as shown by the increase for September 1991.

Although from September 2002 findings data for leavers was insufficiently complete to use, the RI’s returns to HESA showed continued growth (see *App. 5.5*). No gender breakdown was available for these years. For gender ratio for HE students as a whole see *App. 5.6* for national and *App. 5.7* for the RI population.

Considering gender in terms of percentage of the whole dyslexic Leavers’ data, a pattern of uptake of support and swings in usage for this institution was apparent (see *Figure 5.10*). In the early 1990s it appeared that women were more likely to have sought assistance, although they were then overtaken by men until 2001/02.

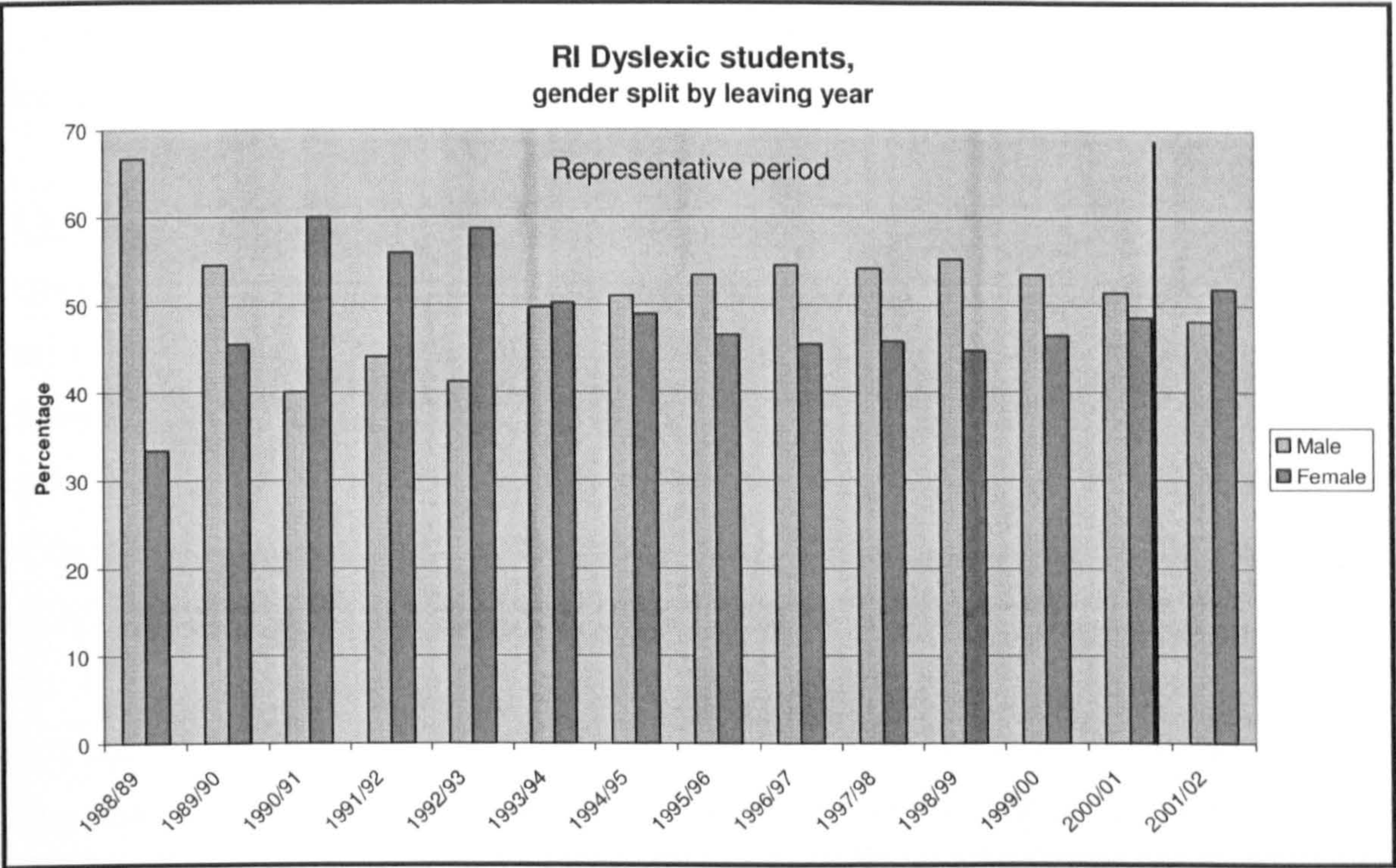


Figure 5. 10 Gender split by year of dyslexic leavers from the RI 1988/89-2001/02 [Leavers]
Considering these figures against national trends it was clear that the RI had a distinctive profile (see Figure 5.11).

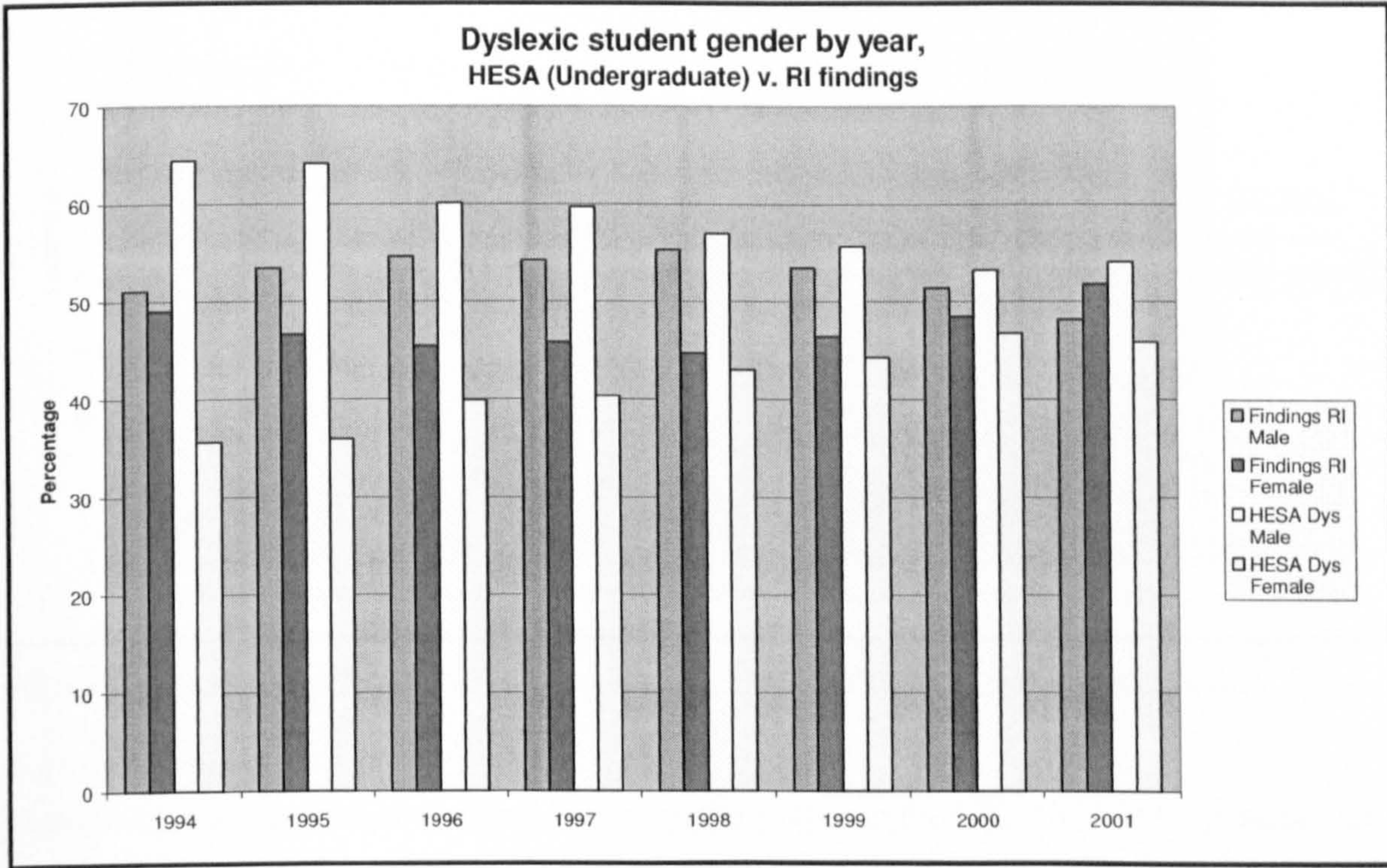


Figure 5. 11 Gender trends 1994/95-2001/02 as percentages [Leavers; RI Returns]
Both sources of data converge on near equal representation of males and females. The HESA figures showed a 10% shift from the majority of dyslexics being male towards an even split. By contrast, at the RI the data showed that the numbers of male and female dyslexics had always been close to equal proportions. The 3% change at the RI, in the

same direction as national trends, meant that for the final year, 2001, there were more declared dyslexic women than men.

5.2.3 Age

Age was another aspect of interest. Was any change taking place in the age groups taking part in HE? This may have had implications for the range and nature of the support demands made on the system. UCAS data included age and gender for undergraduates under the heading ‘accepted degree offers’ for university places in the UK, although not all of these would have enrolled. Further, not all UK domiciled students enter HE through the UCAS system. The data also excludes Open University students.

Over an eight-year period nationally, disregarding gender, 80% of the UCAS applicants were under-21 years old (see *Figure 5.12* and *Figure 5.16* for RI HESA returns data).

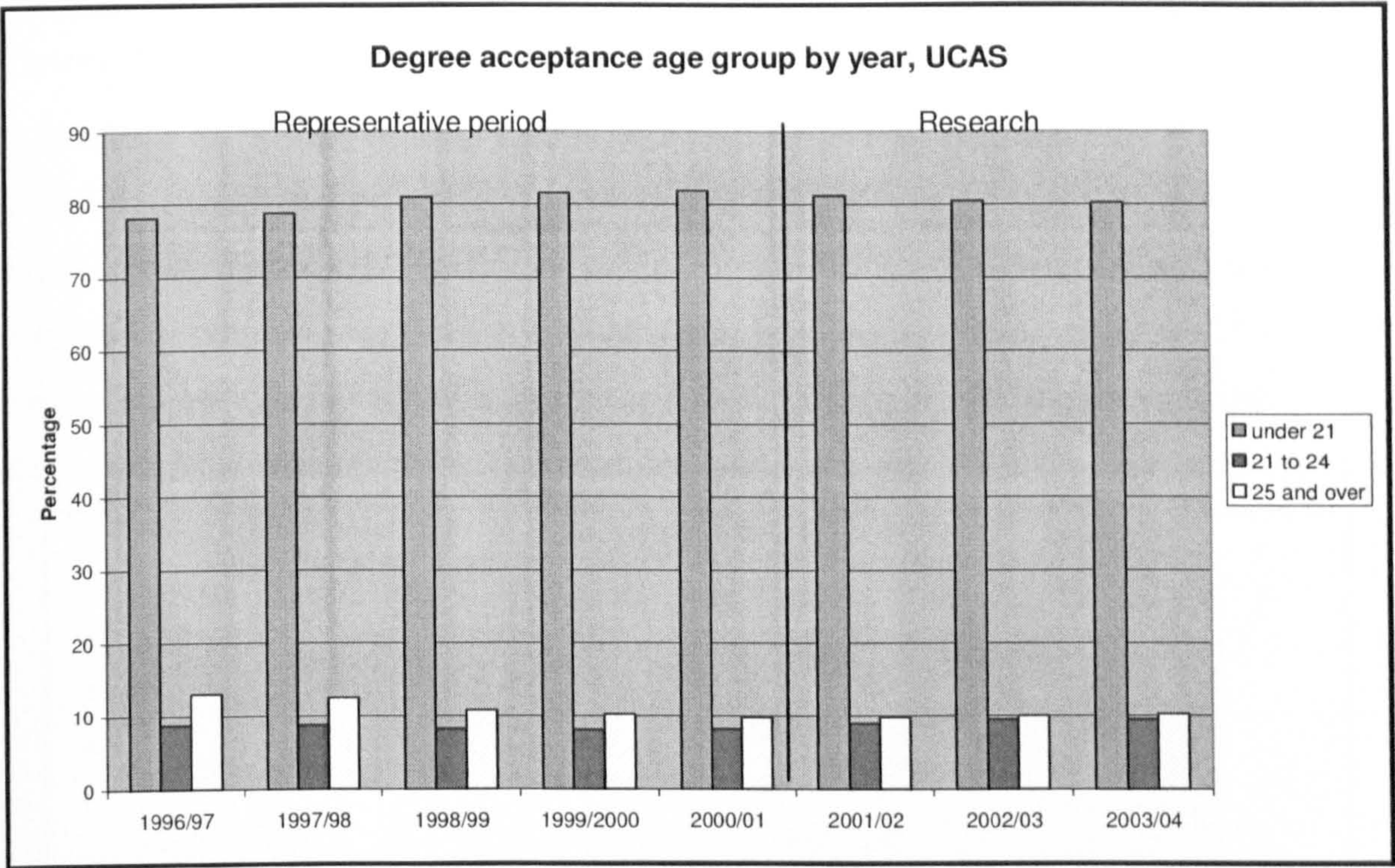


Figure 5. 12 Age groups for degree place acceptance, 1996/97-2003/04 as percentages [UCAS]

Age and gender

Analysing ‘accepted degree offers’ for university places in the UK (UCAS) by gender and age group, women outnumbered men in all age groups between 1996/97 and 2003/04 (see *Figure 5.13*). In the next two academic years, the only age group that showed more men than women was 21-24 years. Most of the growth in the student population had been in the youngest age group and showed the gender growth rates discussed in the previous section (see *Appendix 5.4* for frequencies and extended date range).

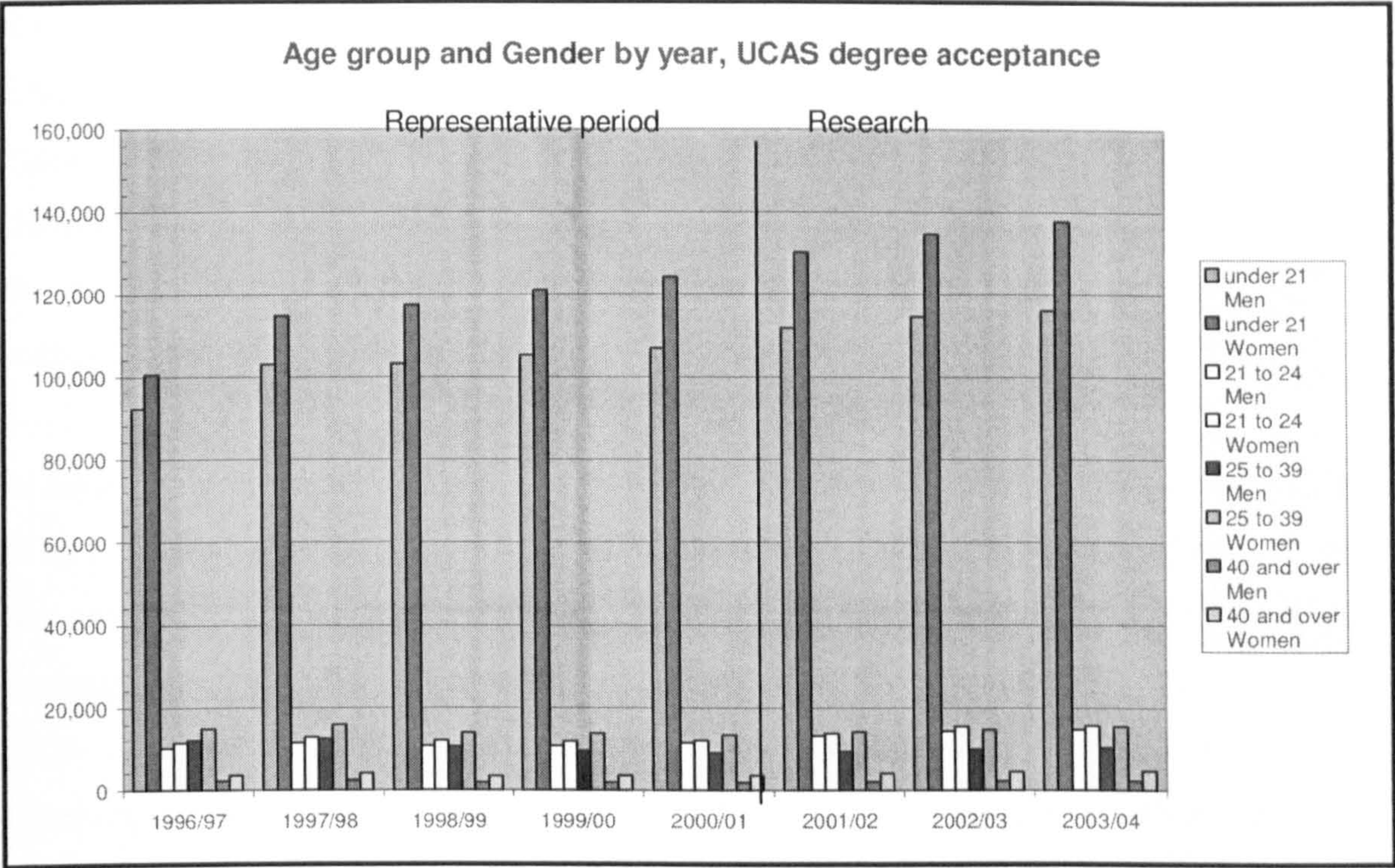


Figure 5. 13 Accepted place by gender and age, 1996/97-2003/04 [UCAS]

A breakdown of HESA national figures for age group and dyslexia was only available for 1995/96 (see Figure 5.14, App. 5. 11 and App. 5. 12), and split at the age of 30 years. Students were far more likely to study before the age of 30, although this pattern was slightly less pronounced in women. In the dyslexic population, studying before 30 years of age was an even more noticeable trend; there were 15 % more male dyslexics in this category when compared to figures for all male students, and 10% more female dyslexics.

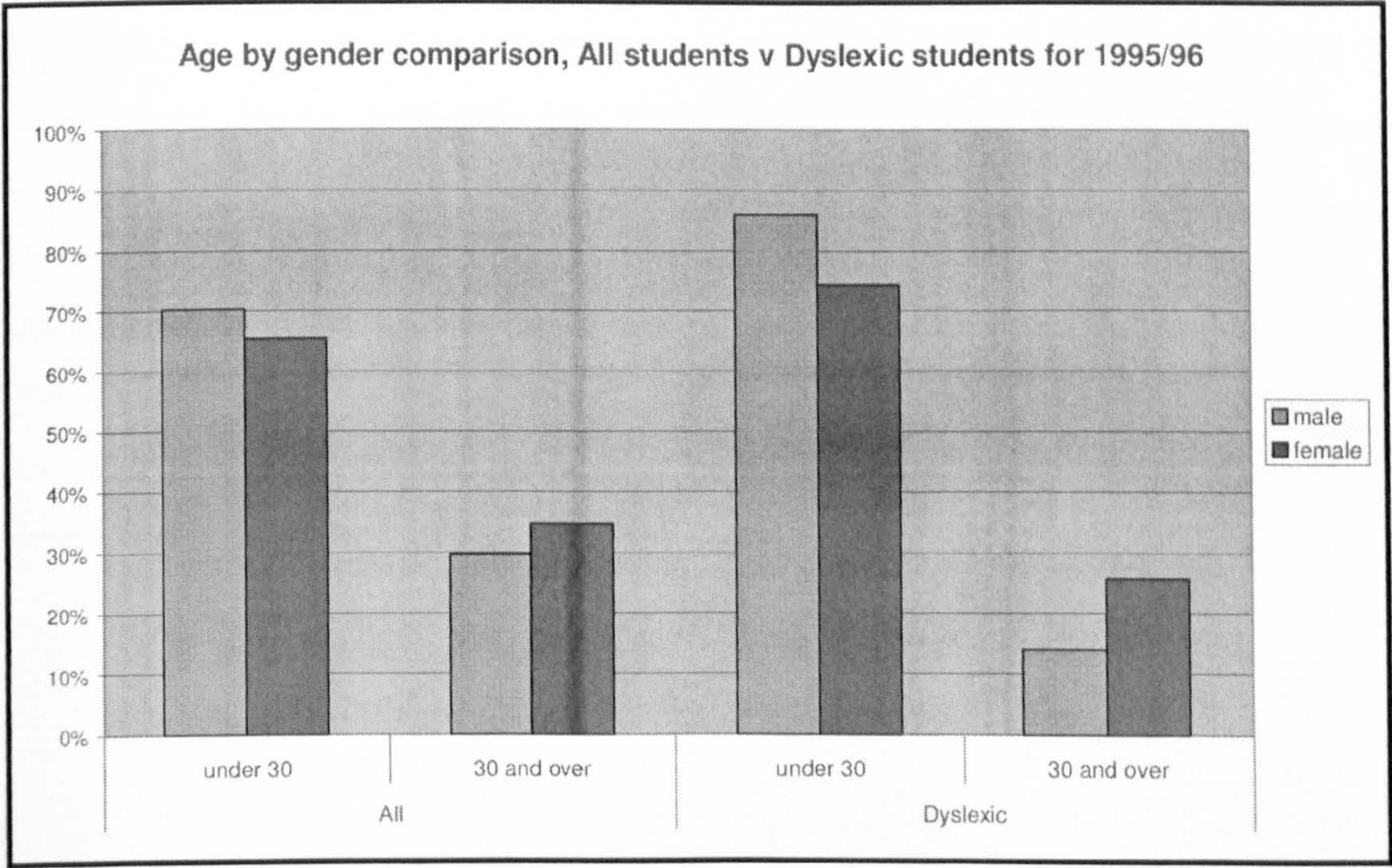


Figure 5. 14 Age Groups by gender, all and dyslexic students – HESA national data 1995/96 [Richardson and Wydell, 2003]

It was shown above (see *Figure 5.7*) that, in subsequent academic years (2000/01-2003/04), the national figures for gender ratio moved towards three women to two men, meaning that women were likely to continue to outnumber men amongst the returning students. Farmer *et al.* (1997, p. 70) found that where there were more mature students, the average age at which dyslexia was identified was later, figures which demonstrate success in widening access in HE.

At least a quarter of the female dyslexic students were aged 30 or over, compared to 14% of men. Using gender totals from the HESA disability charts for 1995/96 (HESA, 1997), it was possible to approximate the actual values the percentages represented. HESA national dyslexic figures for all levels of study in that year showed more men (2001) than women (1169) (see *App. 5.12*). Dyslexic males outnumbered females 1.7 : 1 in 1995/96, according to HESA national disability data for first-year students covering all levels of HE course. More recent data for 2003/04 from HESA showed a change to there being, for the first time, more dyslexic women than men, with a ratio of , 0.99 : 1 (men : women). When only undergraduate first-years were considered for the same year and data, the figures showed 1.04 : 1, with slightly more men.

Data for the RI show a rather different picture to the national situation. The national UCAS data for undergraduate course acceptance showed that 80% of applicants were under the age of 21 (see *Figure 5. 12* above). The RI returns to HESA included an age group breakdown, but this did not fully correspond to the UCAS groupings, which had to be summarised. Gender within age data were not available for the RI HESA data.

Early data only gave an age break down of under- or over-21 years. The number of students under-21 years of age at the RI peaked in 1999/2000 at 43%, showing an average of 39% over the eight year period 1996/97-2003/04. The numbers of students aged 25 years and older remained within the range of 40-44% of the RI totals for that period (see *Figure 5. 15*).

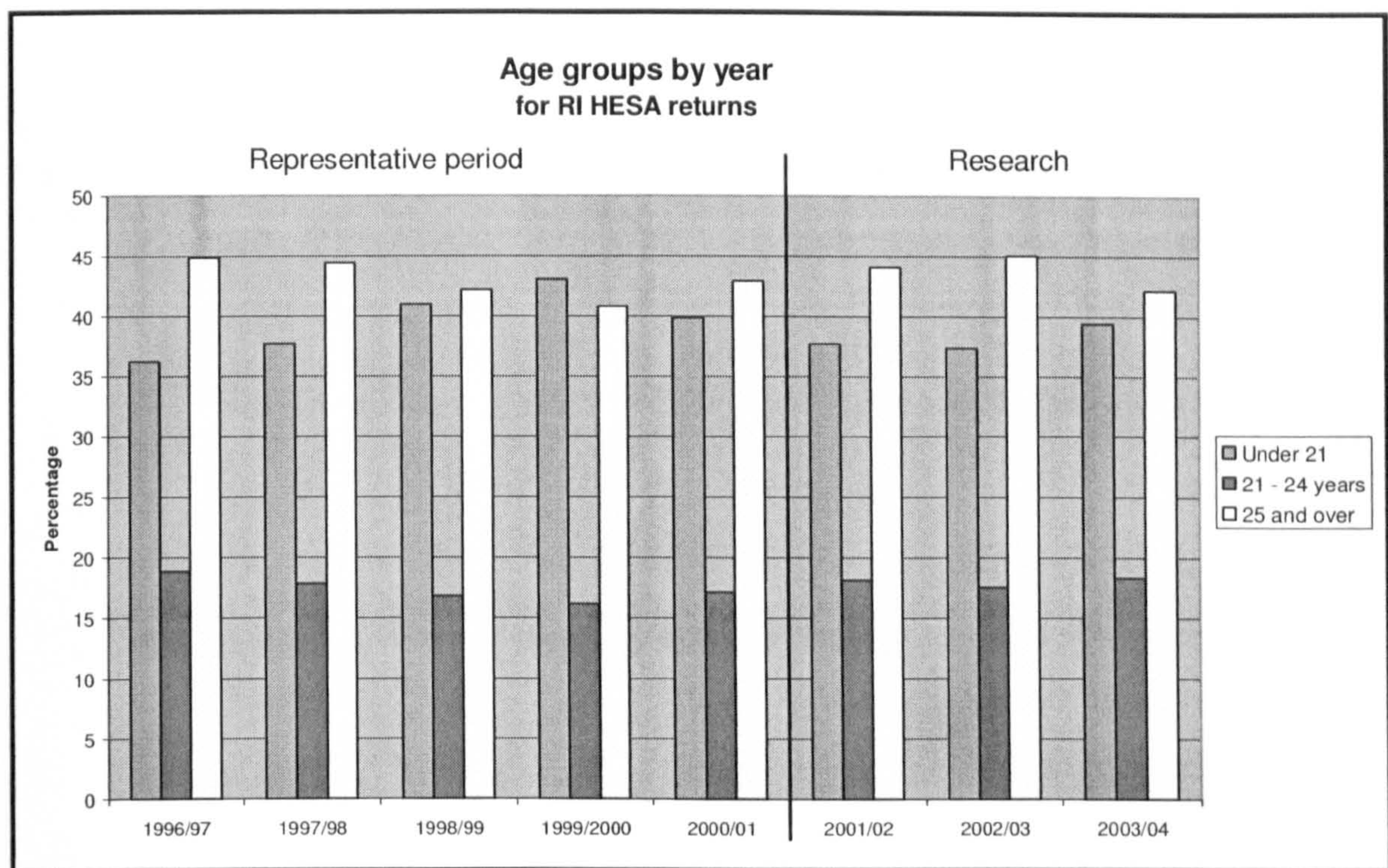


Figure 5. 15 Age at enrolment trend within the Research Institution, 1996/97-2003/04 [RI returns]

RI data were broken down further to show that mature students, aged 30 years and over, represented 28-33% of students during this period (see *Figure 5. 14* and *App. 5. 11* for HESA data).

The available dyslexic Leavers' data did not reflect the exact period covered by the HESA returns for the RI, but there was an overlap of five years. The Leavers' data only had a flag to indicate whether students were eligible for a mature student's allowance, meaning that they were aged 25 or over (see *Figure 5. 16* for combined under-21 and 21-24 data). Analysis of the dyslexic Leavers' data showed that the total percentage for students aged 25 and over did not reflect the 40-45% range seen in the RI as a whole (see *Figure 5. 15*). Student numbers aged 25 and over were noticeably lower for dyslexic leavers, but still higher than the UCAS national data of 10-13% (see *App. 5.10*).

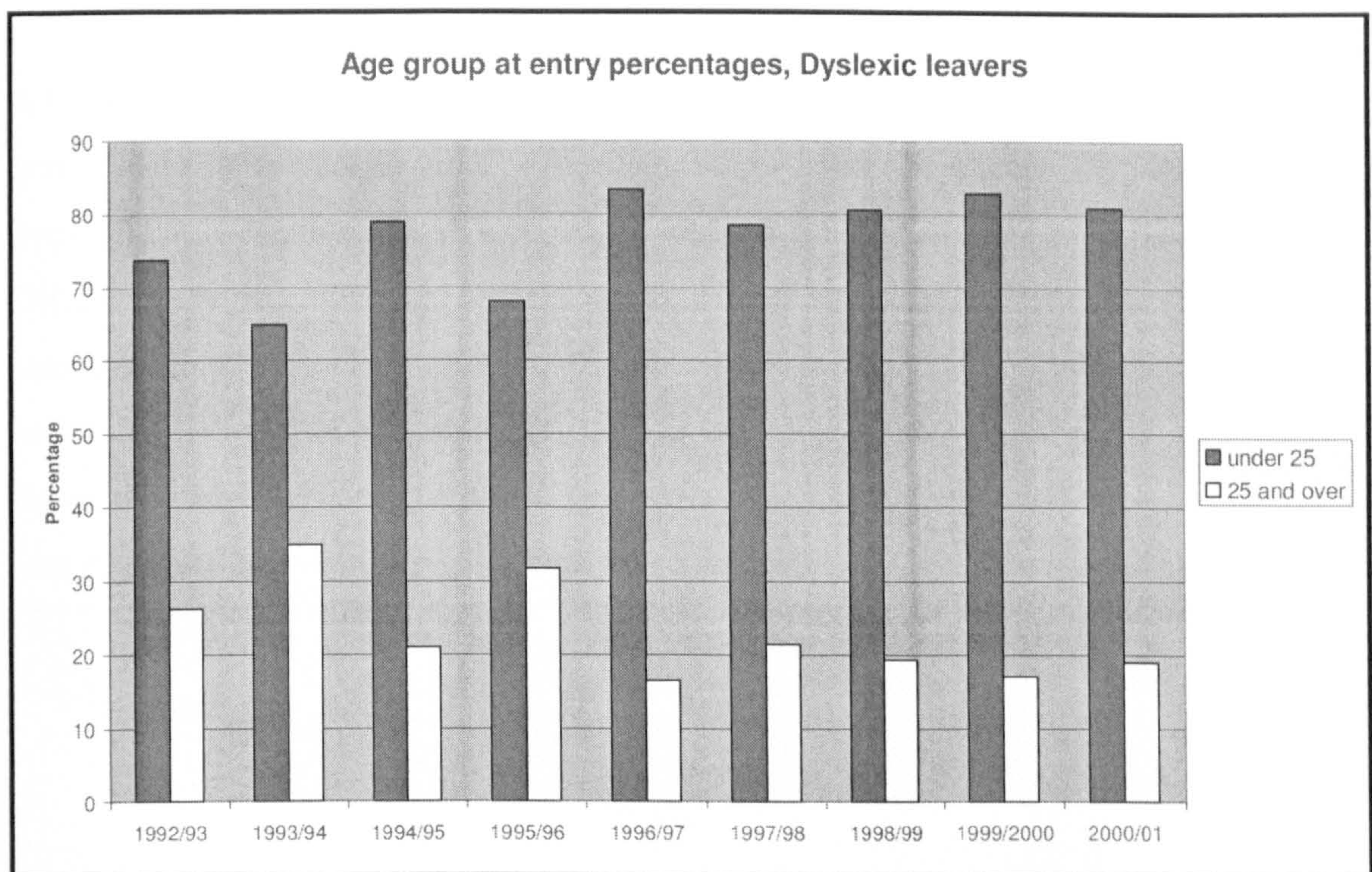


Figure 5. 16 Age group at entry, Dyslexic Leavers' findings as percentages [Leavers]

5.2.4 Courses and Outcomes

This section reviews the most frequent levels of study, the mode of study, the fields and the outcomes for students. Given the number of permutations of joint course degrees as well as single subject degrees, a field-by-field breakdown of dyslexic areas of study would have been too fragmented. To overcome this, fields were grouped into subject areas for both national HESA and RI statistics. Although closely related, the RI groupings were not quite the same as those used by HESA (see *App. 5.15*), as they reflected the course structures of the RI.

These data gave the opportunity to establish which courses attracted dyslexic students, and to consider whether there was any evidence that particular spatial or lateral skills influenced the selection of course. Anecdotal evidence, prior to the research, suggested that the popular courses were: Estate Management, Architecture and Planning, Engineering, Computing, and Hospitality.

Field

There are two ways to consider the fields studied by students. The first is to take a specific student population, in this case dyslexic, and identify the most commonly occurring areas of study. The second is to analyse the populations studying courses to identify the areas in which dyslexics formed the largest proportion (see *Figure 2. 3*).

A breakdown of the fields studied at HE, using the first approach, appeared in Richardson and Wydell (2003) for the student population in 1995/96 (see *Figure 5. 17* and *App. 2.10*, *Appendix 5.5* using alternative sort orders), but was not available for other years. Differences between national data for subjects taken by students with no disability can be compared to that for all RI students. The RI returns to HESA in 1995/96 (see *Figure 5. 17*) reflect the RI's specialisations (see *App. 5.15* for HESA versus RI subjects). This chart shows the distribution across subjects as a percentage, sorted by non-disabled percentages (see *App. 5.13* and *App. 5.14* for alternative sort orders).

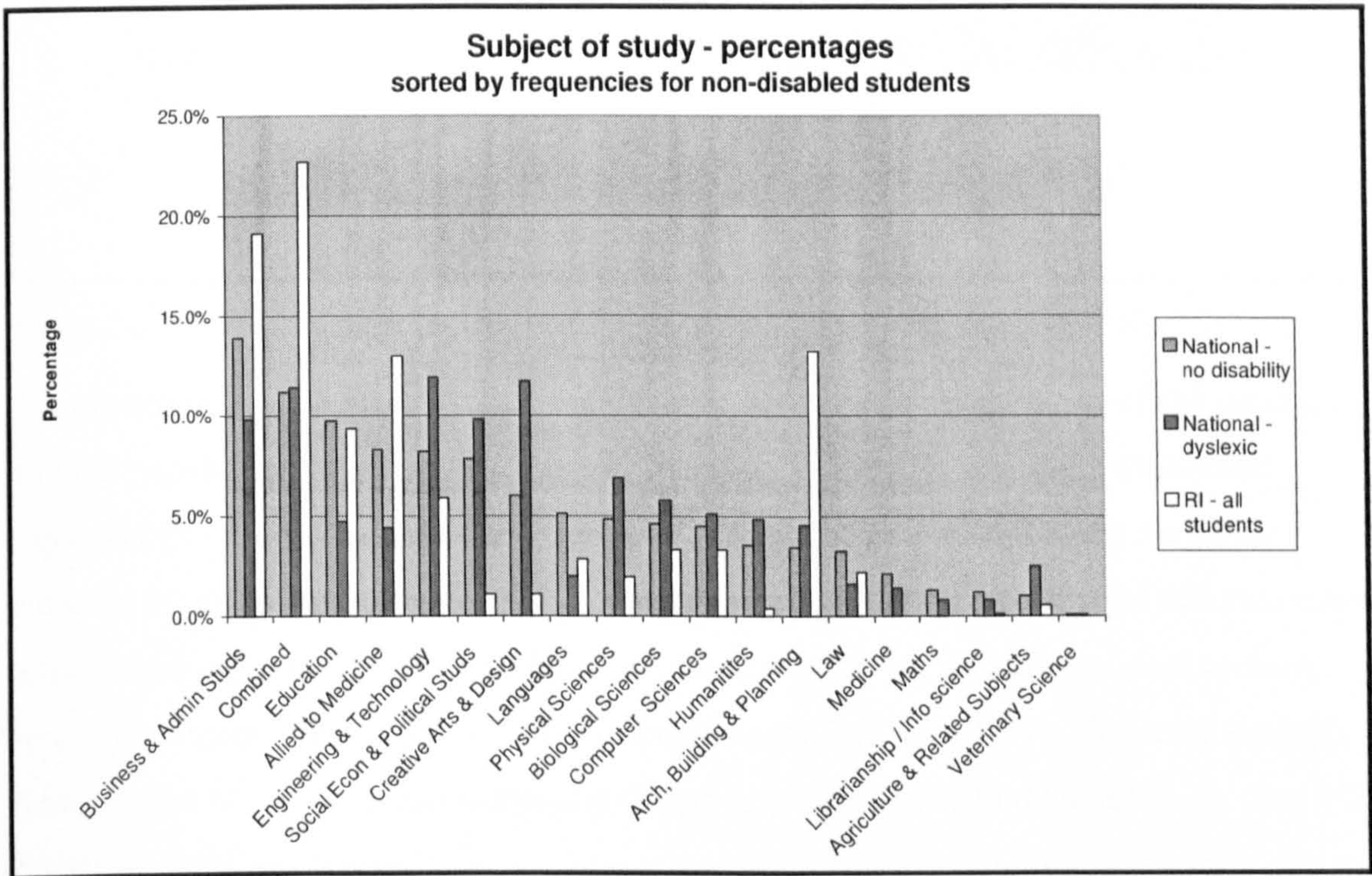


Figure 5. 17 Subject figures, sorted by non-disabled student percentages for 1995/96 [HESA, DSA; RI Returns]

The representative period showed dyslexic students at the RI had most often studied courses in the built environment area, including architecture, (see *Figure 5. 18*, *App. 5.19* for the returns for research period, and *App. 5.20* and *App. 5.21* for Leavers' data at the end of research period). The jump in students studying Education was the result of the merger of a teacher training college with the RI (see *App. 5.19*).

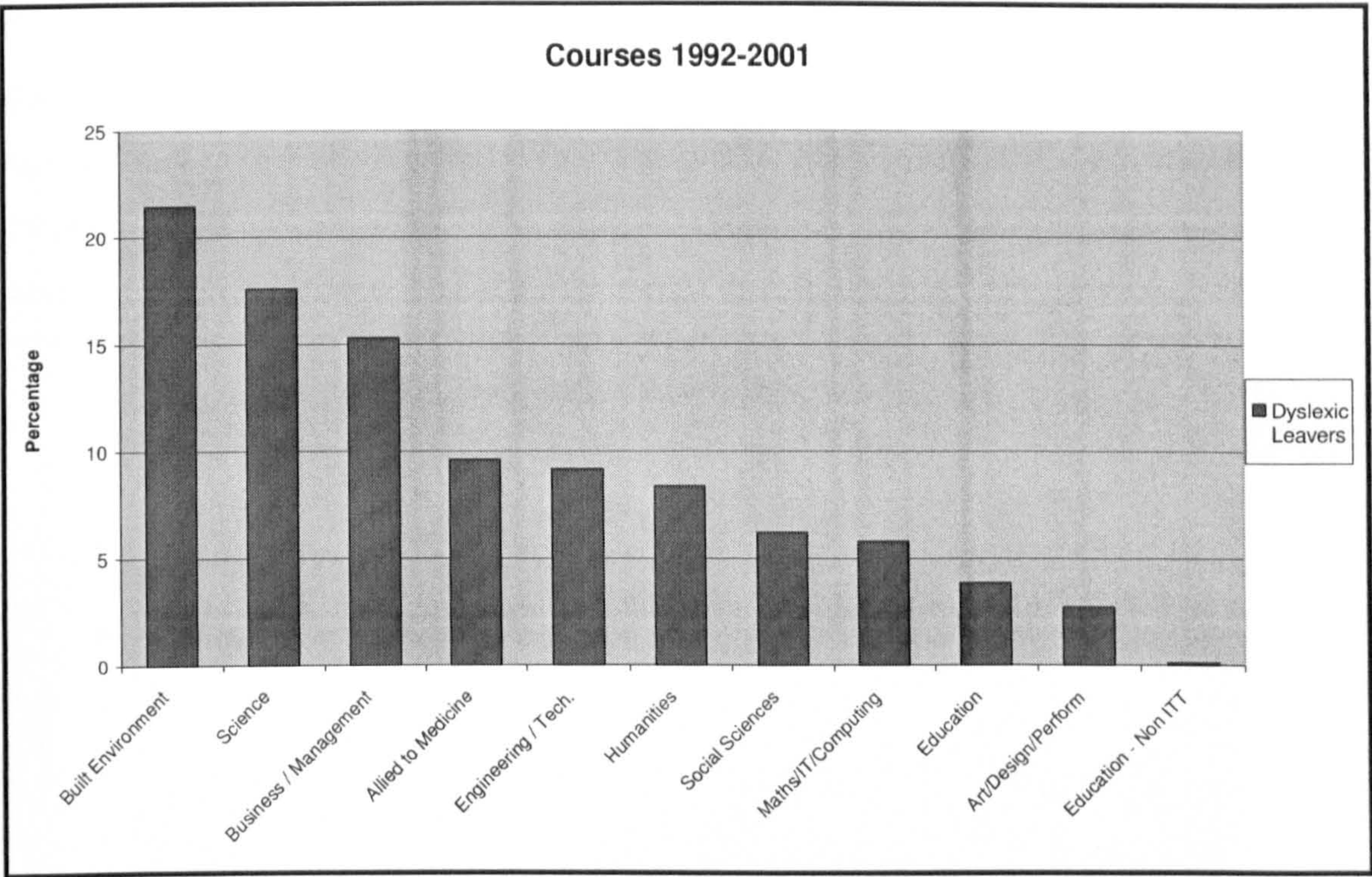


Figure 5. 18 Study areas dyslexic students at the RI 1992-2001, percentage [Leavers]

The second approach – i.e. considering dyslexic students as a percentage of the national subject population – showed year on year increases in the five subjects with highest representation of dyslexic students (see *App. 5.16* and *App. 5.18*). Taking the same subjects for all students, but splitting sciences (source differences), showed that two areas which were especially popular with dyslexic students, i.e. agriculture and architecture, were not subjects with major HE student populations (see *App. 5.17*). Dyslexic students formed over 6% of the creative arts and design population, a field undertaken by over 9% of HE students as a whole.

The RI students had the option to combine two joint courses, chosen from a large range, to form a degree. Data showed the choice of subject area, and also the distribution of subjects across single and joint field degrees¹ (see *App. 5.22* and *Figure 5. 19*). Sciences and humanities were usually studied as part of a joint degree, while courses allied to medicine were almost exclusively single subject areas. In all, 598 students were studying a single field degree and 277 were undertaking joint studies. The data were sorted by dyslexic student percentage on single subject courses for a period before the research (see *Figure 5. 19*, and see *App. 5.22* for data gathering period).

¹ Students studying in joint fields could result in 0.5 of a person appearing in the internal statistics produced by the RI for an area of study.

The Student Services data revealed that in the region of one third of dyslexic students studied for joint degrees in the RI. The Student Administration data showed 30% on joint courses prior to the research period (see *App. 5.23*). For the period of the research this dropped to 24% (see *App. 5.25*). Leaving data showed that students on joint courses were more likely to pass their courses (see *App. 5.24* and *App. 5.26*).

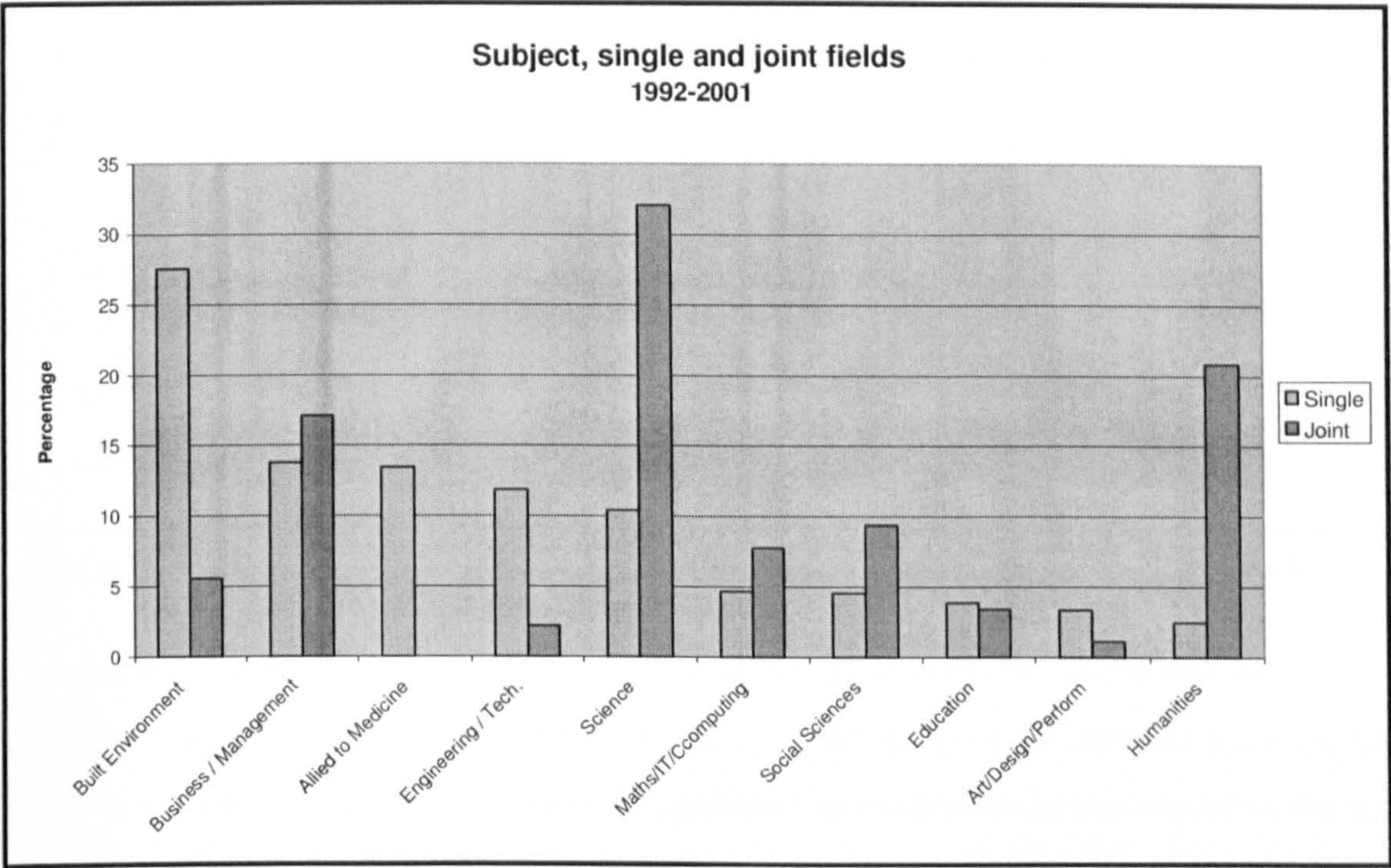


Figure 5. 19 Single and joint field percentages by subject for dyslexic students, 1992-2001 [Leavers]

Levels of study

James’ (2003) analysis of HESA data for 2001/02 showed that 1.97% of undergraduates were dyslexic, with this dropping to 0.75% for postgraduate dyslexic students. The DSA was not available for postgraduate courses until 2000. This was reflected in subsequent figures. The HESA disabled data covered all levels of study but only for first-year students (see *Figure 5. 20*). There was a growth in numbers for first-year postgraduate studies over several years.

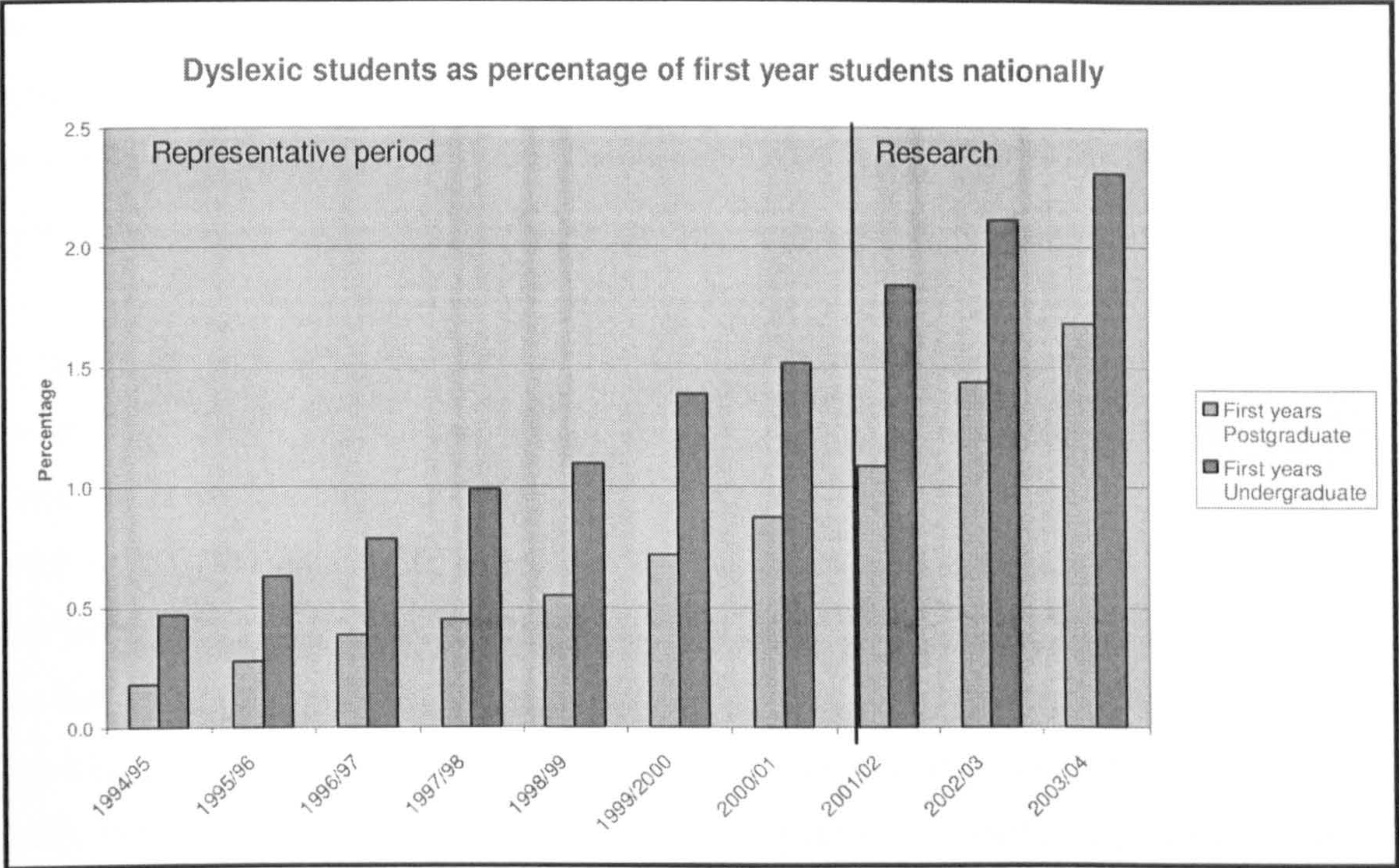


Figure 5. 20 Dyslexic students as percentage of national undergraduate and postgraduate, first-year students, 1994/95-2003/04 [HESA, Disability]

The majority of the RI students were taking undergraduate courses. There was no breakdown of the level of study (foundation, undergraduate, postgraduate, or research) for dyslexic students in the RI, but greater detail about the level of study was available for the total RI population (see *Figure 5. 21*).

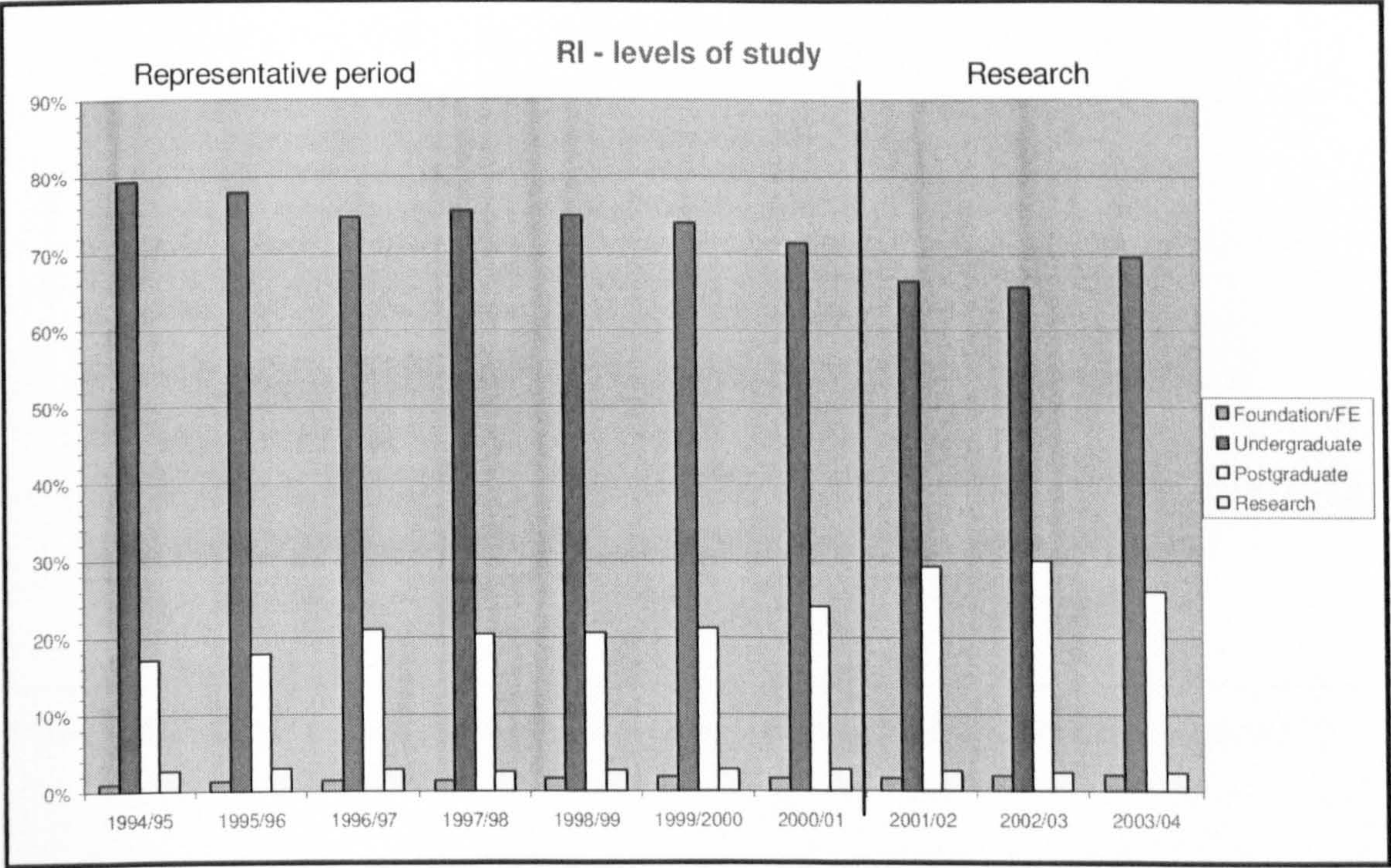


Figure 5. 21 Level of study in RI 1994/95-2003/04 [RI Returns]

An analysis of HESA 1995/96 data (Richardson and Wydell, 2003 p. 489) found a significant distribution difference between dyslexic students, other disabled students, and those without a disability in terms of numbers taking a first degree rather than sub-degree, postgraduate research and taught courses ($X^2 = 607.16$; d.f. = 3; $p < 0.001$).

In the RI, the earliest records showed that there were some dyslexic students studying at postgraduate level. The first on file left in 1993. Initially the numbers were very small so percentages easily changed. The percentage increased from 4% studying at postgraduate level in 1993/94 to almost 10% in 2003/04. In 2000/01 numbers peaked. When the DSA was introduced for these courses the percentage came close to doubling from 7.7% to 14%, but that effect dropped away (see *App. 5.27*). The increase in postgraduate students reporting dyslexia suggests either that difficulties were only experienced at that level of study, or that there was a positive impact on expectations from earlier support either at school or during undergraduate studies. *Figure 5. 22* in conjunction with *Figure 5. 5*, illustrate that the 10% of students studying at a higher level were part of a significantly expanded dyslexic student population (see *Figure 5. 21* for all RI students).

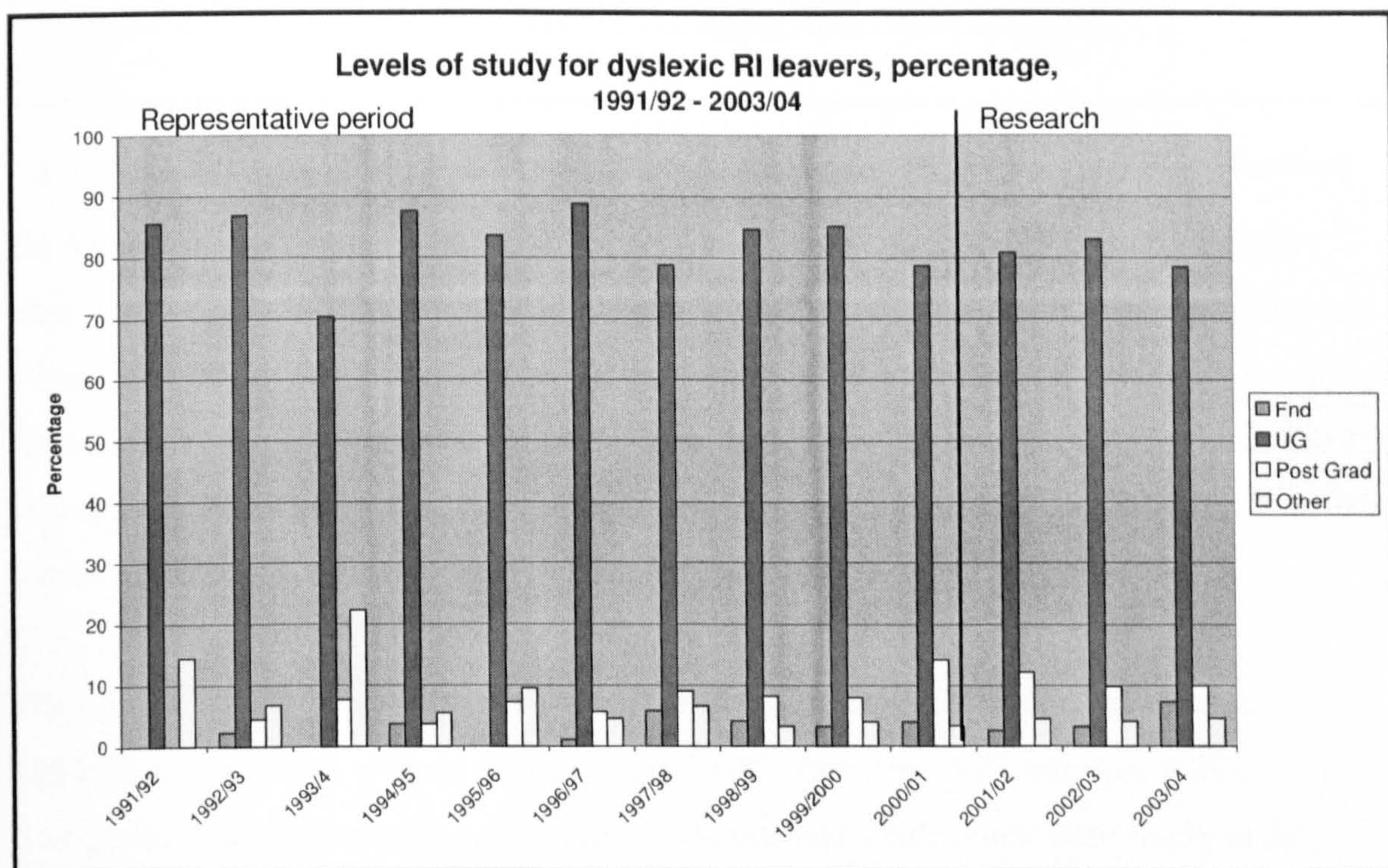


Figure 5. 22 Level of study, by years, Dyslexic Leavers findings 1991/92-2003/04 [RI Returns]

Mode of study

HESA data recognised full-time and part-time modes of study. Nationally, in the first-year undergraduate population as a whole, the proportion of part-time students increased by 16% between 1994/95 and 2003/04, from 29% to 45% (see *Figure 5. 23* and *Appendix*

5.8). A matching increase was seen in the non-disabled part-time student population (28% to 44%). Issues of stress and pressure relating to study for dyslexic students might have been expected to have led to a higher percentage of part-time students in the dyslexic population by comparison, but this turned out not to be the case.

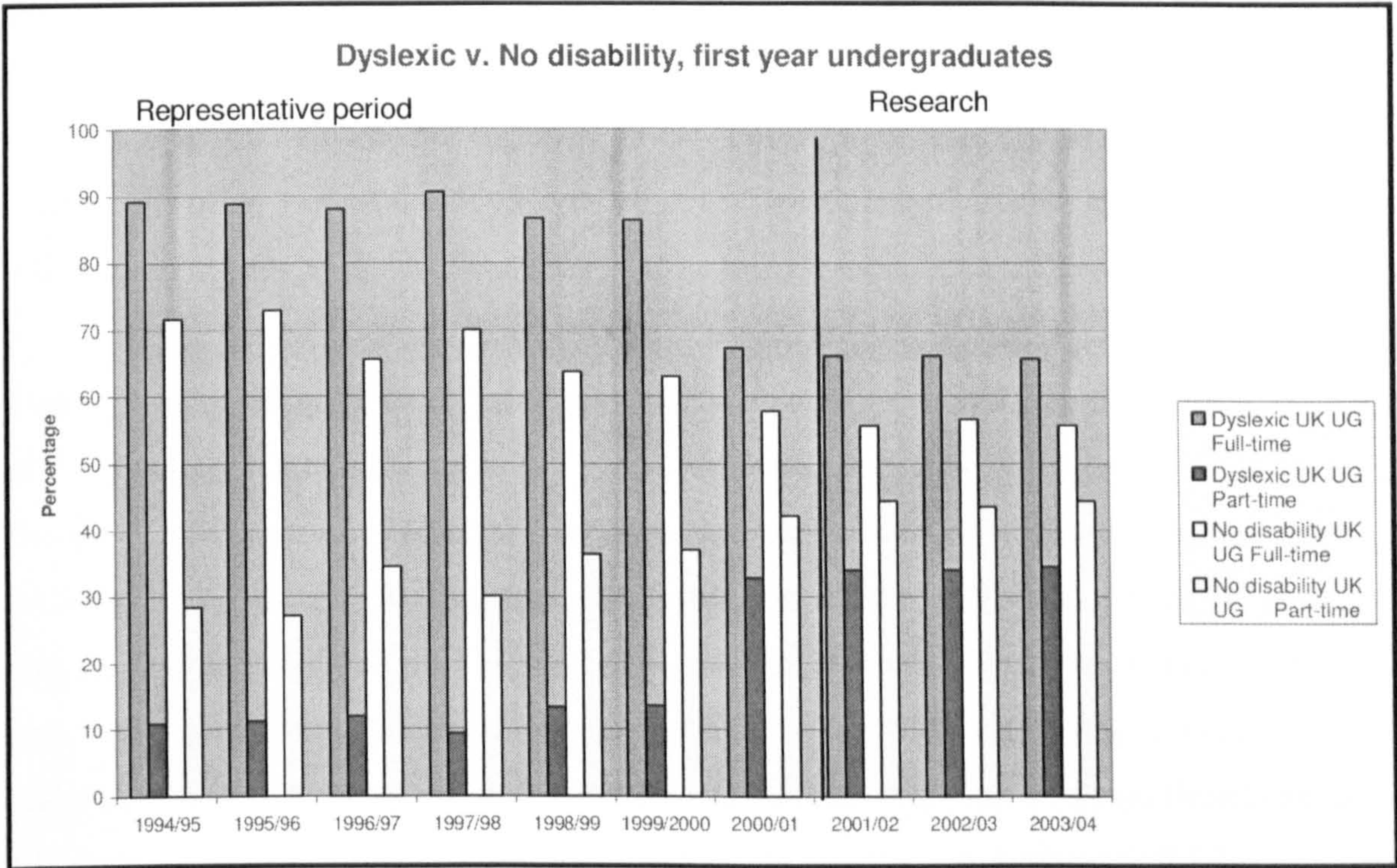


Figure 5. 23 First-year undergraduate students, modes of study, 1994/95-2003/04 [HESA, Disability]

DSA support was available for part-time students from September 2000, some 10 years after its first introduction as a means related allowance for full-time undergraduate courses. The availability of the DSA appeared to have a great effect on dyslexic part-time numbers, with the numbers tripling from 11% to 34% of dyslexic students immediately. Over the 10 years, the part-time ratio for students as a whole increased from 29% to 45% part-time, whilst dyslexic students remained nearly twice as likely to study full-time.

The number of students studying part-time at postgraduate level fluctuated between 1994/95 and 2003/04, with an overall drop of 3-4% (see *App. 5.28* and *App. 5.29*). Postgraduate students without a disability were one and a half times more likely to be studying part-time. The introduction of DSA for part-time postgraduate studies had no visible impact on study modes of dyslexic students.

Richardson and Wydell (2003, p. 489) found significant differences in the distribution of full-time and part-time study for dyslexic students compared to the total HE population with no reported disability. Dyslexic students were less likely to undertake part-time

study, even ‘when the effects of age, gender, ethnicity and entrance qualifications were taken into account’. They commented that this was not a result of the impact of Open University data being included, as at that time dyslexic students formed ‘only 0.13% of its student population.’ Although the national undergraduate numbers for dyslexic first-year students showed a tenfold growth in part-time study between 1994/95 and 2003/04 (see *App. 5.30* and *App. 5.31*), that was just 6% of that population. The majority of dyslexic students, it appeared, were not choosing to avoid doing too much ‘demanding’ academic work at one time, but rather they were opting to focus totally on study, maybe to avoid prioritizing and organisational challenges.

Two aspects of studying were covered by RI data on the mode and format of study. Mode of study simply recorded whether the course was studied on a full-time or part-time basis. Format of study recorded whether a full-time course involved placements and if so, what form they took. Sandwich students studied full-time when they were at the RI, but their courses also included practical elements off campus. Whether this, rather than the subject area, attracted dyslexic students favouring a hands-on approach was not addressed by this research. At the RI, there was an 8% increase in students studying on a part-time basis at all levels between 1994/95 and 2003/04, while distance learning dropped to 2.5% (see *Figure 5. 24*). The level of student numbers on sandwich courses remained constant.

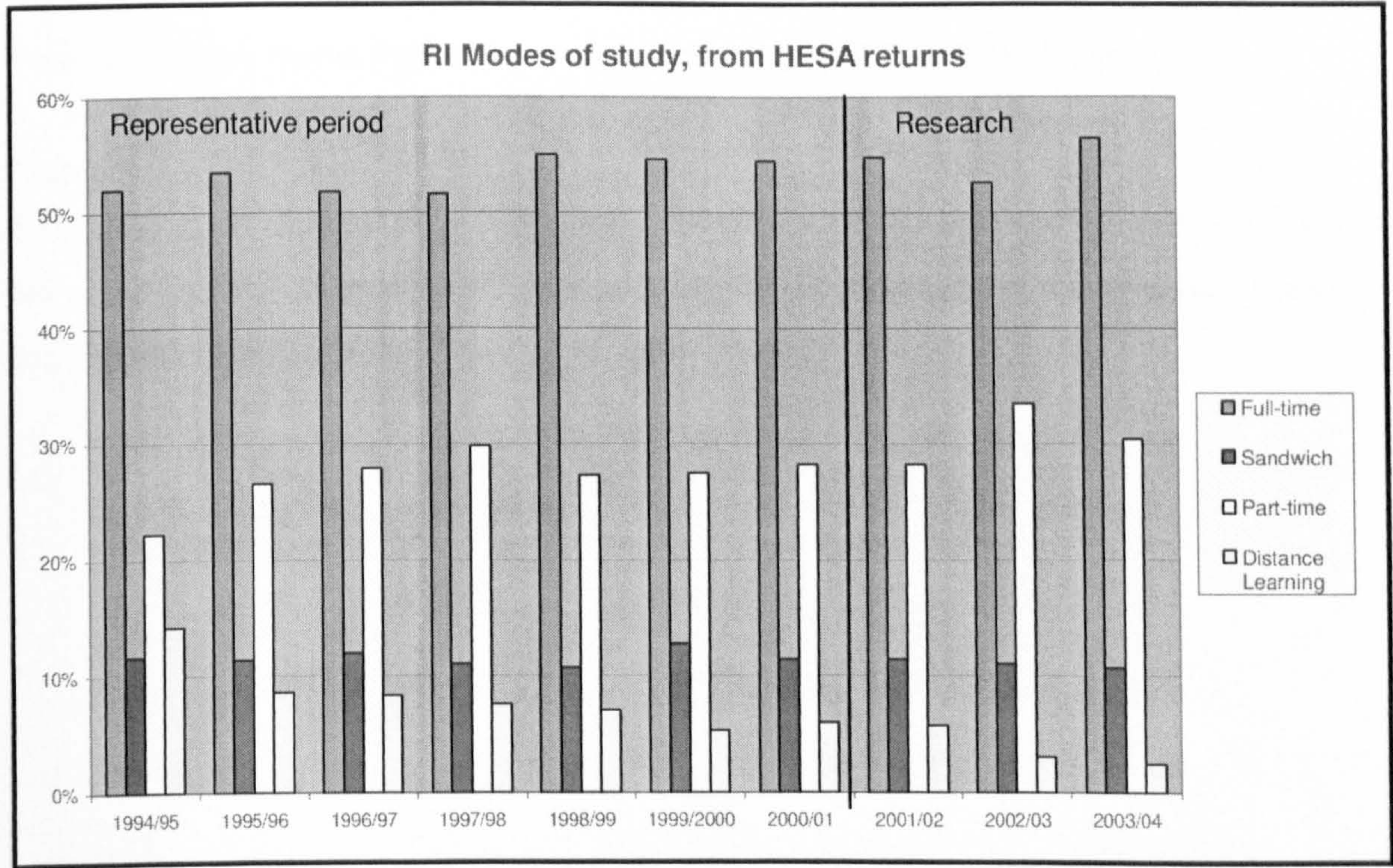


Figure 5. 24 RI Format of study trends, all students, 1994/95–2003/04 [RI Returns]

The modular structure in the RI made it possible to change to part-time study for domestic, employment or health reasons. In *Figure 5. 25* the mode known to Student Services was used, which was not fully available for leavers in 2004. The growth in the ‘sandwich’ mode of study was not sustained in dyslexic students, but remained higher than in the RI as a whole. Part-time study was not as common as for the RI as a whole. For the mode trends for the whole institution see *Figure 5. 24*.

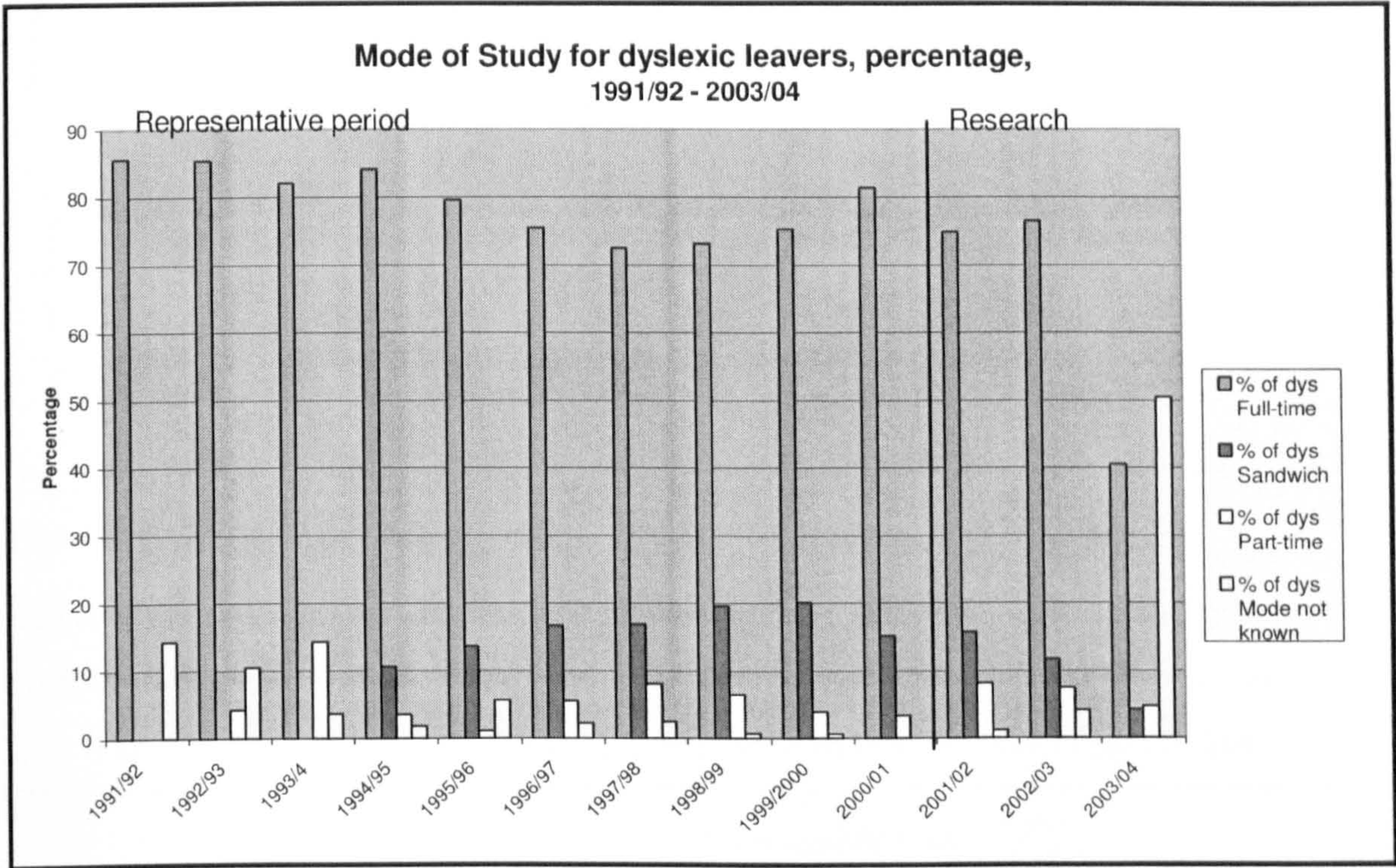


Figure 5. 25 Study modes, Dyslexic Leavers percentages 1991/92-2003/04 [RI Returns]

Outcomes

Using data from Richardson and Wydell (2003), dyslexic students were shown to achieve a lower number of ‘good degrees’. This outcome distribution can be clearly demonstrated for 1995/96 (see *Figure 5. 26*).

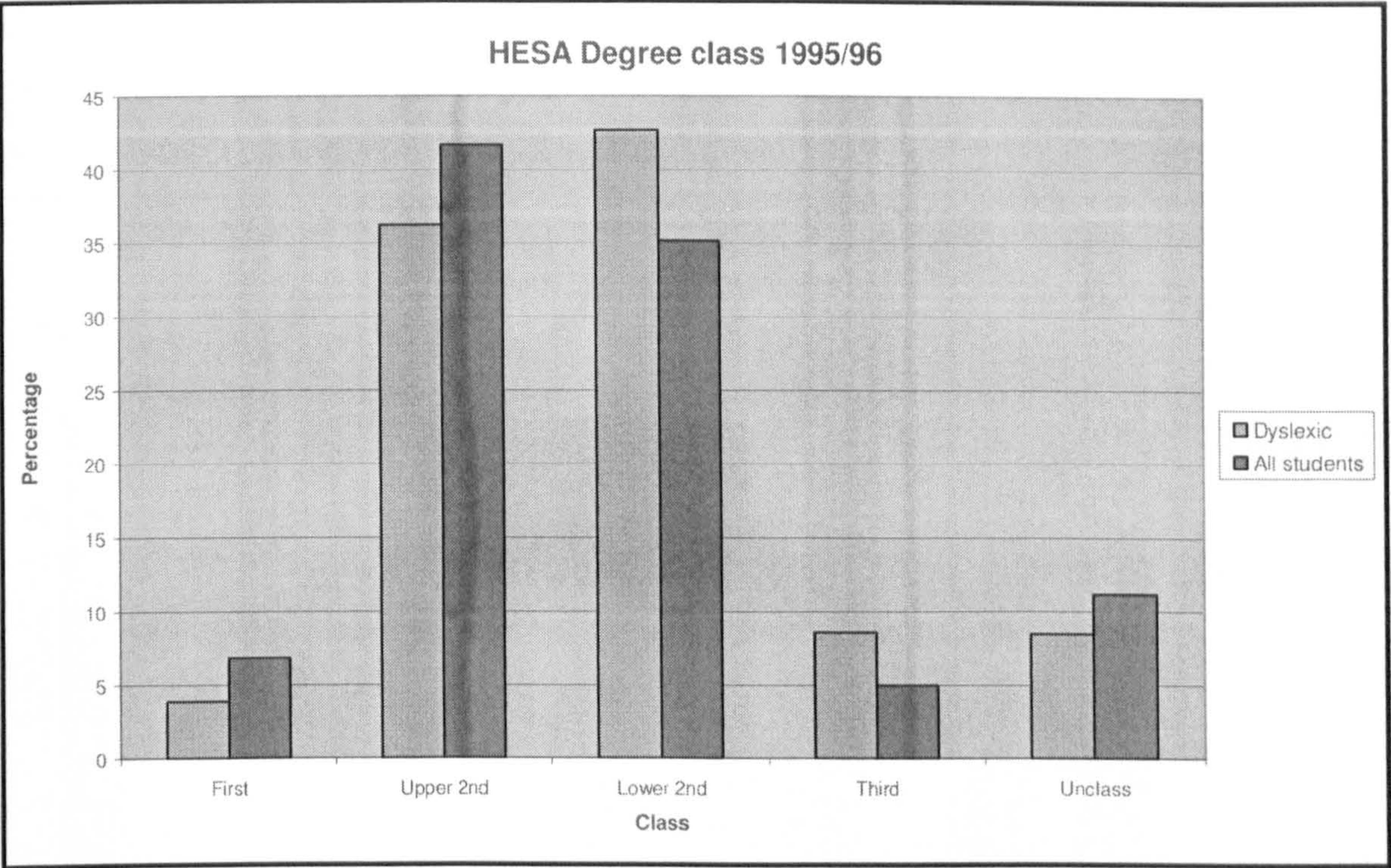


Figure 5. 26 HESA Degree class percentages 1995/96 [Richardson and Wydell, 2003]

The only figures available for dyslexic students leaving the RI showed that the greatest number of those who successfully completed their degree achieved a 2:2 (see Figure 5. 27). This reflected the national dyslexic figures seen in 1995/96 (see Figure 5. 26).

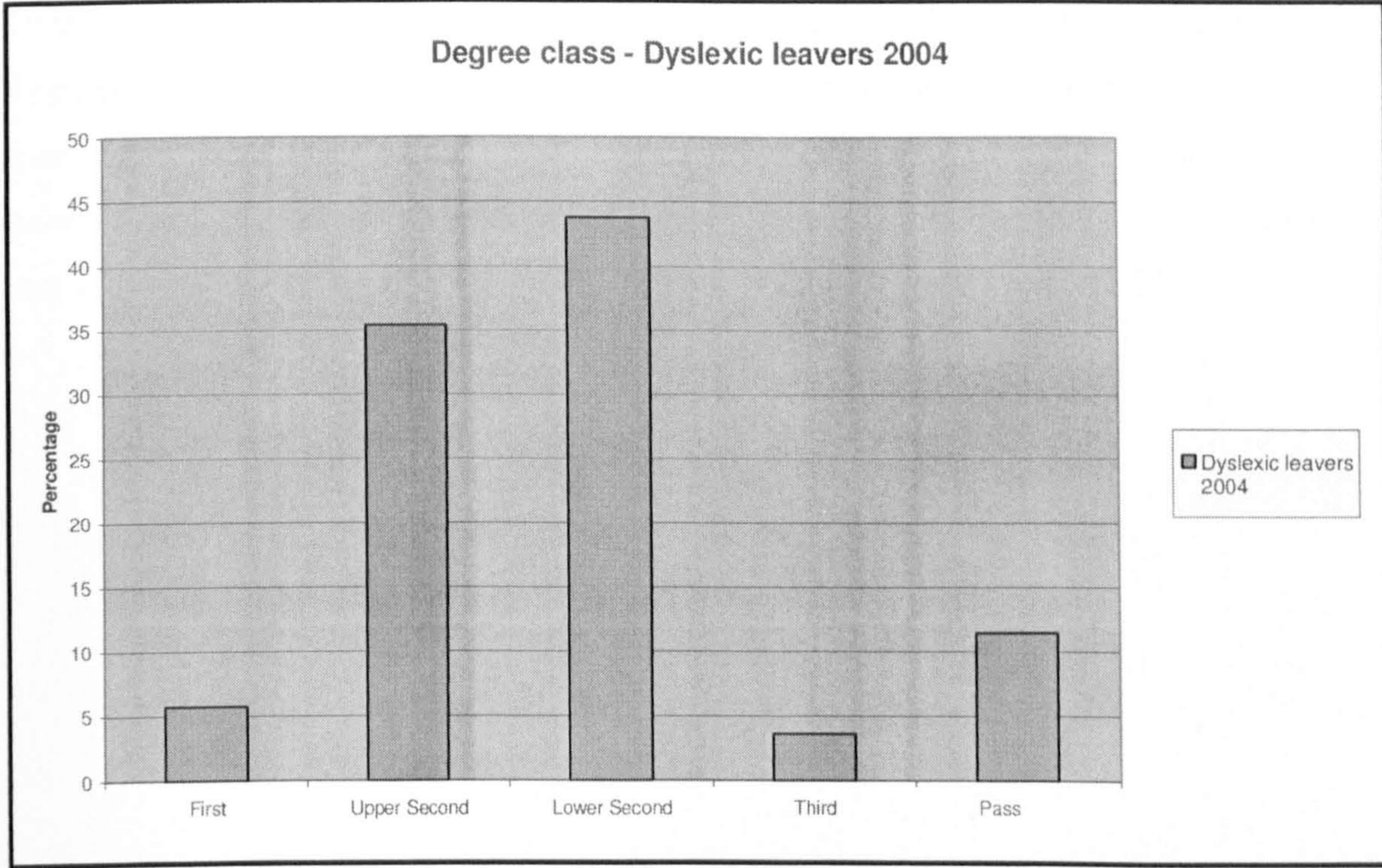


Figure 5. 27 Degree class for dyslexic leavers at the RI percentages 2003/04 [CSMS/ESIS / Student Administration, 2005]

The vast majority of dyslexic students completed their courses with a leaving status of ‘OK’, with the next largest group still awaiting their results (see App. 7. 1). ‘OK’ covered

all forms of passing, at any level of study. The percentage of dyslexic students leaving due to 'academic failure' peaked at 2.7% in the HESA returns in 1999 gradually dropping to below 1% by 2003 (see *Figure 5. 28* for frequencies).

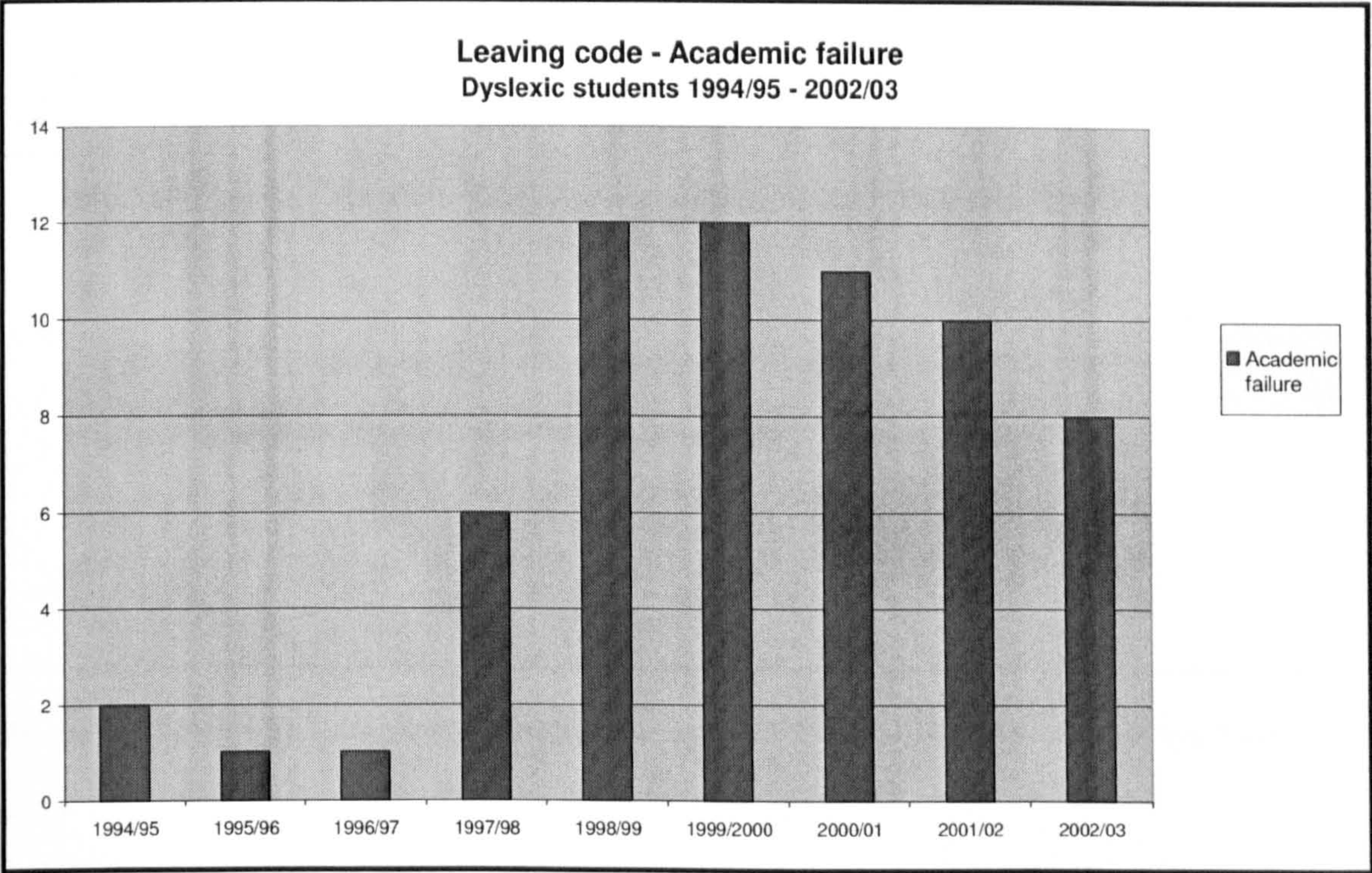


Figure 5. 28 Academic failure amongst RI dyslexic leavers [Student Administration and Systems]

Data were available for the degree class for 2004 leavers (N=192) by study area. In Engineering, and 'IT and Maths', it appeared that dyslexic students were able to achieve more upper than Lower Second Class degrees. Science was the only other area where lower-second degrees did not outnumber Upper Seconds. However, these data were for one year only and reflected a very small number of students (see *Figure 5. 28*).

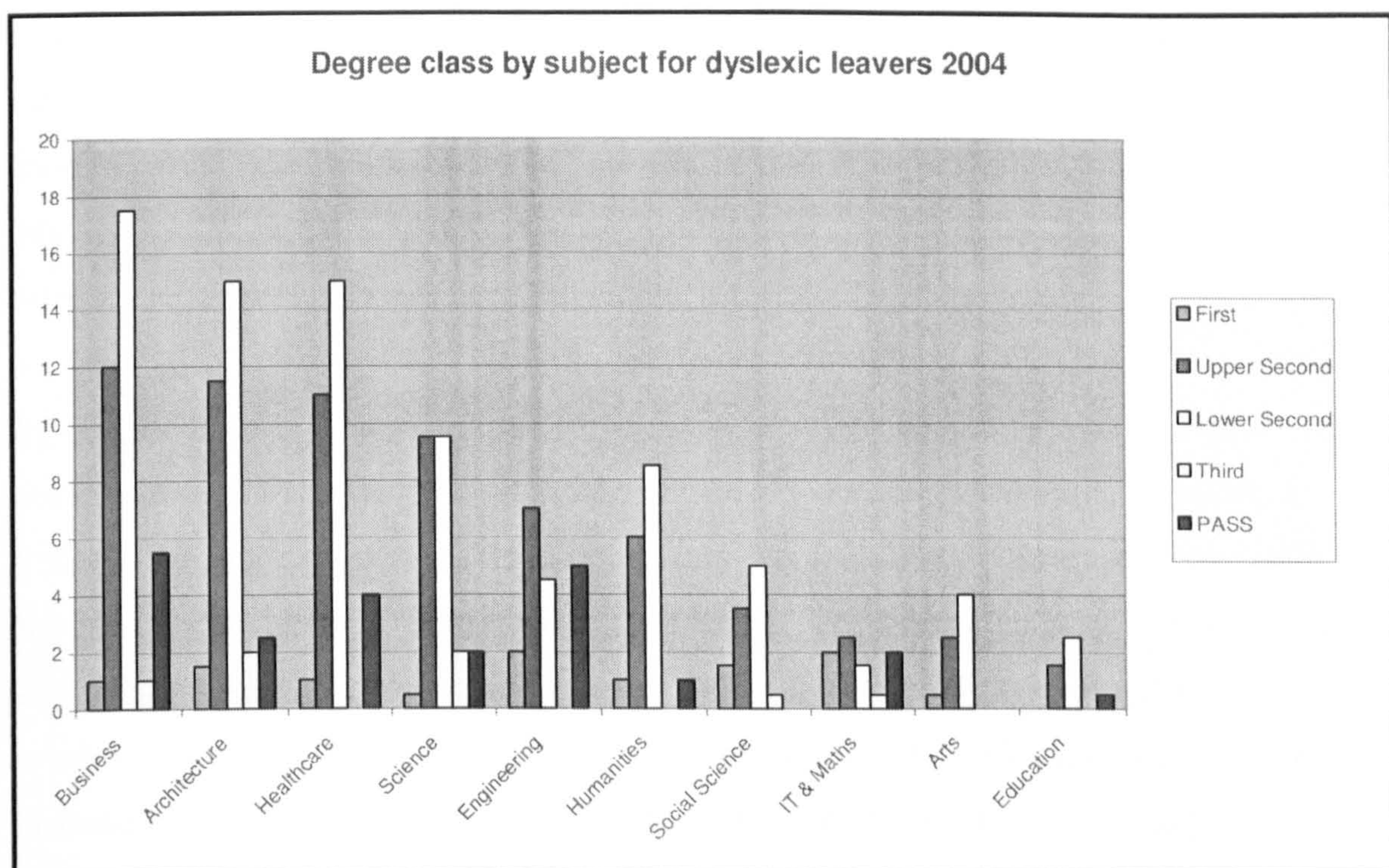


Figure 5. 29 Subject by degree class for dyslexic leavers in 2004 [Student Administration, 2005]

5.2.5 Dyslexia First Recognised in HE

A persisting issue, even with increased dyslexia awareness in schools, has been the growing number of dyslexic students being identified whilst at university. Singleton *et al.* (1999) found that those identified at this stage formed 43% of the declared dyslexic population in HE. Coates (2003) noted clear patterns of late identification particularly of females with specific learning difficulties (see Section 2.2.1 – Age at identification and gender).

It might have been anticipated that the impact of better school support would have reduced the number of late identifications in HE. The drop may not have happened as expected because of the sizeable numbers of mature dyslexic students, especially at the RI, entering HE as part of the drive to widen participation. The form of support on offer at university, particularly a computer, may also have highlighted the benefits of formal identification, increasing the numbers who requested assessment.

In the Leavers' data, details of dyslexic students who were identified for the first time whilst at university were recorded in a number of ways. Some students were flagged for receiving their 'First assessment' at the RI. Another set of students had 'Screening' as a reason for contacting Student Services; where screening was followed by an Educational

Psychologists' report, the student was included in the number of those first assessed. The total in the research sample was 197. The amount of detail recorded, including information about reasons for contacting Student Services, increased as the dyslexia support services developed. Overall, this approach confirmed that at least 15% of the 'leavers' were first formally recognised as dyslexic at university, the majority being female.

By considering the average number of years that recorded students were at university but not in contact with Student Services, an estimate of the average percentage of dyslexic students that were unknown to the support team was calculated by year (see *App. 5.32*). In any single year, 1991-2001, it was estimated that 25% of subsequently recognised dyslexic students were unknown to the support team. Although the percentage dropped for a number of years, there was an increase in numbers because the volume of students known increased. The data was not available to determine whether growth of the support team addressed this situation.

5.3 Contact with Support Team

There were two aspects of support that were documented in the records; firstly, contact with the support team and secondly, actual study support usage. All students known to the support service, registered or not, were kept informed of support options and procedures, and could attend group study-skill sessions. Those who did not have the documentation to be registered were not receiving full support; however, they did take up support team resources. According to information from the Induction Week Dyslexia Support Workshop (September 2004), in 1994 the RI was supporting 150 dyslexic and SpLD students. In 2003/04 the figure was nearly 1,000, of which 600 had full, registered support in place.

There were 1655 cases with 'Historic' data for dyslexic students at the end of this research (1647 with more detailed data). A sub-set, the 'Leavers' sample, excluded any participants in the surveys and interviews (see *App.5.36*). The representative sub-set came from the 'Leavers' sample, and primarily pre-dated the data gathering for this research and informed research design decisions.

The Historic data indicated that 78% were fully registered with Students Services, of which 9% could not be attributed to a research group (see *Section 4.2.1* – Research groups and *Section 5.4.1*). The data showed that 37% of the Leavers had registered with the support

team at the start of their courses or even before enrolling, forming the initial Research Groups A and B, and at least 21% were identified during their course (Group C). Of the Leavers' sample, all had dates showing when they became 'known' to Support Service, and they were considered supported from this point until the end of their course.

Not all dyslexic students knew of, or acknowledged, their dyslexia on starting at the RI. The same annual tally method used with Leavers' data to calculate the number of dyslexic students present in any academic year (see *Section 4.3.4*) was applied to those in the support system in any year. The difference between figures for students who were dyslexic in any year, and those known to the support system in the same year reflects the numbers not being supported for some part of their studies(see *Figure 5. 30* also *Figure 5. 32*).

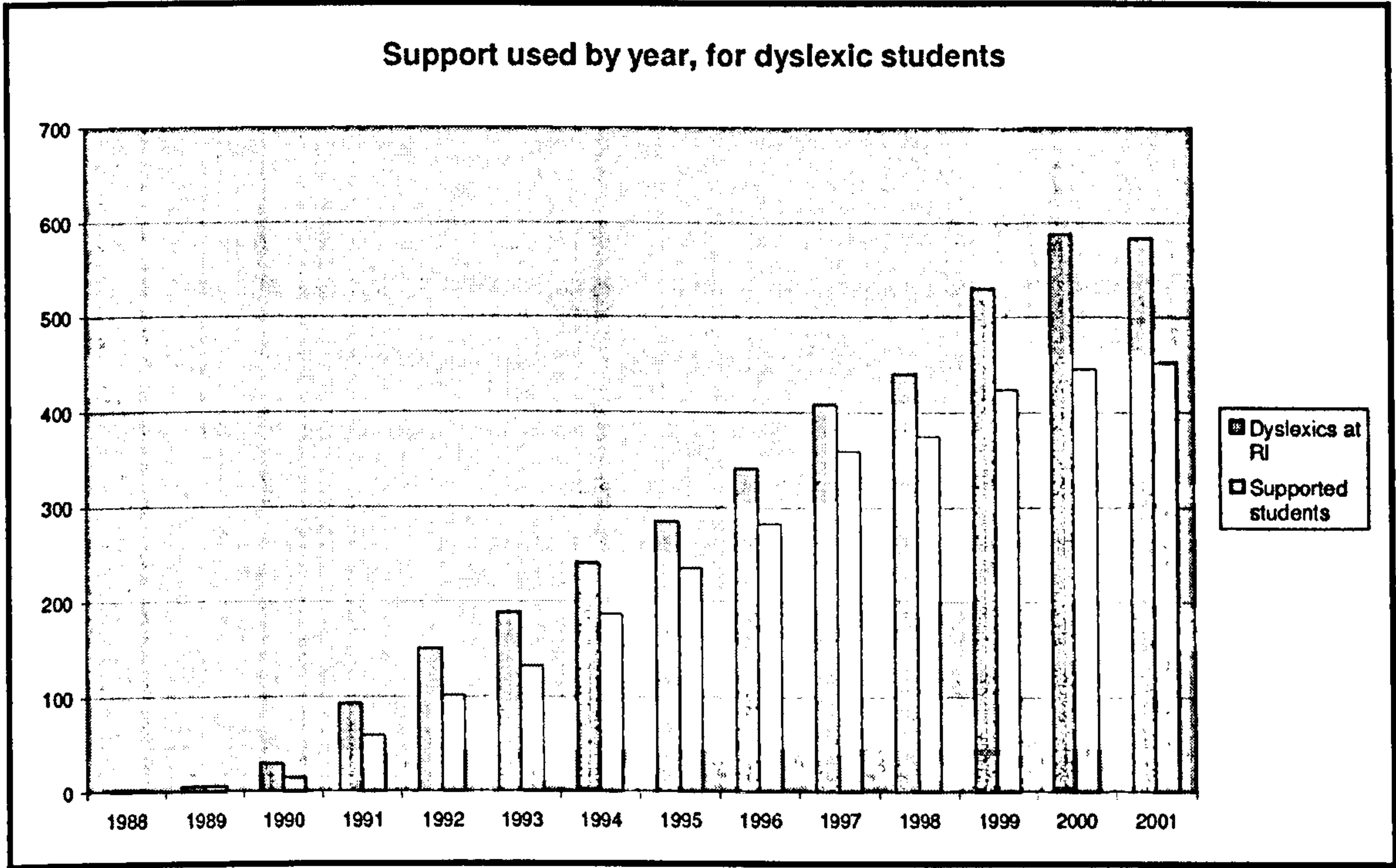


Figure 5. 30 Dyslexic students at RI and known to student services [Leavers]

5.3.1 Reasons for Contact

The Leavers' data was analysed, regardless of registered status, to investigate the reasons for contact (see *Figure 5. 31*), the length of time students were known to staff in Student Support (see *Figure 5. 32*) and frequency of use of key forms of support (see *Figure 5. 34* and *App. 5.33*). The amount of contact a dyslexic student had with Student Services was also analysed by gender (see *Figure 5. 33*).

The sub-set of Leavers for whom contact reasons were available numbered 1405. The reasons for contacting Student Services, in relation to dyslexia, were wide ranging from asking about dyslexia and discussing an existing report, to course related issues including dissertation support. The nature of the contacts for the period 1992-2004 were summarised for clarity by identifying a number of ‘topics’ (see *Table 5. 2*). This involved categorising the recorded information under nine topic headings, which accommodated all the known contacts. For example, ‘Admin-support’ grouped together all paperwork related to visits – LEA, DSA, Registration – initial contact, information on dyslexia and ‘what happens next’.

Summarised contact topics	Contacts relating to
Health / disability	ADD, ADHD, other – assessed not dyslexic, relating to other disability, stress and illness issues
Liaising - course related	Course issues and discussion with department staff, placements, failure, counselling recommendations
Exams	Temporary and full exam arrangements including use of reader, scribe or PC. Problems with exam rooms, the need for special format papers, practical tests, class tests and retakes.
Registering	Reminders and follow-ups as well as completion of registration
Funding	Financial aid and funding for assessments and support
Equip	Contact details for needs assessments and equipment quotes, hire, fault fixing and upgrades
Support	Information on available support - tutors, groups, module, drop-in, advanced reading, maths, IT, for distance learners, dissertation, coloured reading filters and note takers
Dyslexia assessment	Initial discussions about dyslexia and screening, contact details for educational psychologists, reviewing report contents including international ones and addressing problems with reports
Admin-support	Pre-course contact and information, paperwork relating to student contact with LEA/NHS relating to disabilities and DSA, appeals and complaints, booking appointments and rescheduling missed appointments, updating associated paperwork for subsequent courses, marking guidelines and providing information to give others about dyslexia

Table 5. 2 Summarised topics of contact with Student Services

The key areas were help with administration issues and ‘Dyslexia assessment’ (see *Figure 5. 31*). ‘Dyslexia assessment’ included screening visits, provision of Educational Psychologist contact details and report reading (see above *Table 5. 2*).

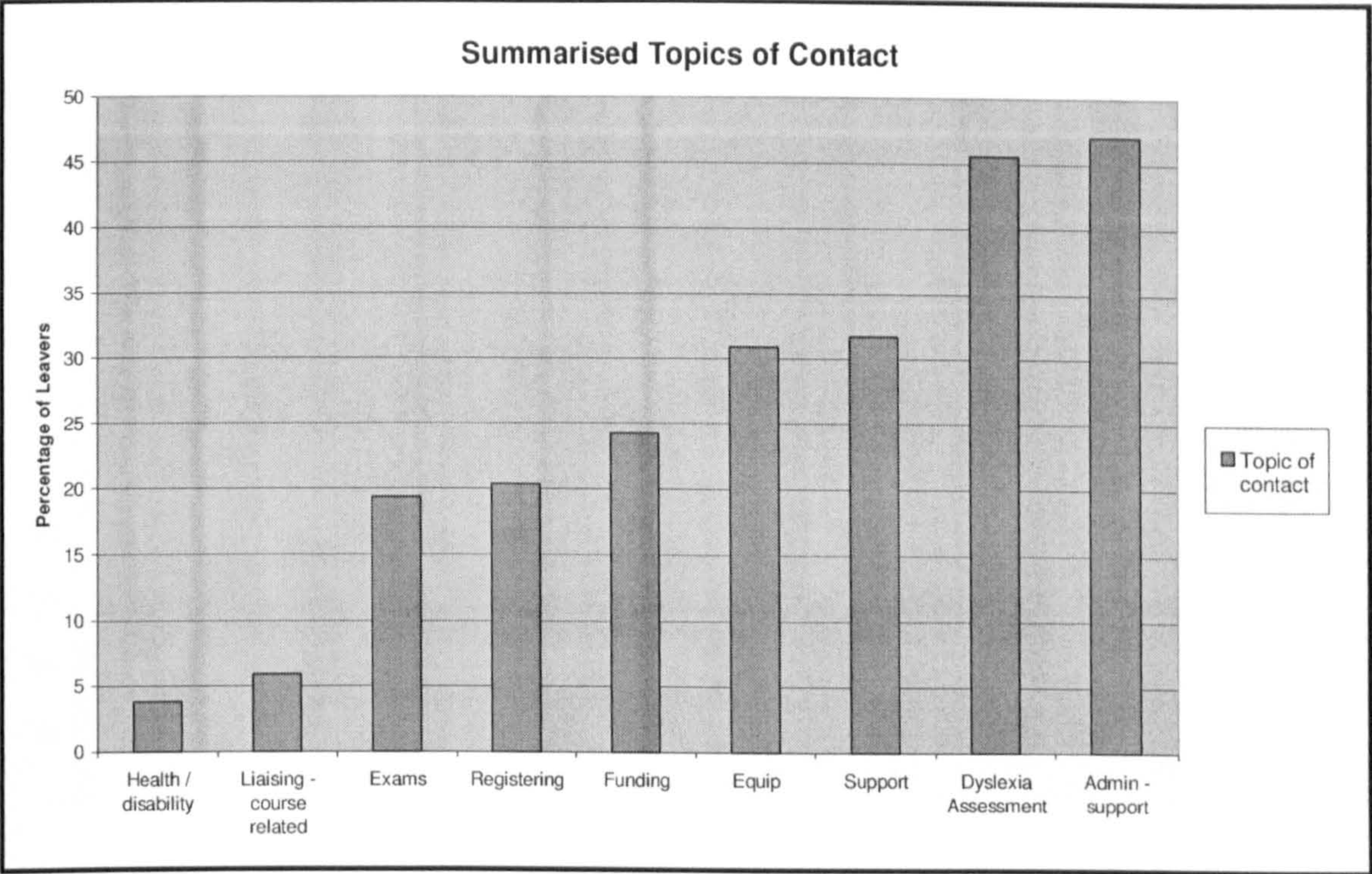


Figure 5. 31 Reasons for contacting Student Services, percentages 1991/92-2003/04 [Leavers]

5.3.2 First Contact

One of the reasons for ‘first’ contact with the support team was a desire for dyslexia screening, another was for Financial Aid applications. Out of 152 contacts, relating to Financial Aid, 61 were for first assessments. The number of contacts rose when the staffing level in the support team increased in November 1999, allowing more attention to be given to screening, but may also have been affected by the Financial Aid in place from 2000 (see Table 2.7). Until Financial Aid was used to fund assessments, first assessment information was not being specifically gathered. The introduction of financial assistance covering the cost of the initial Educational Psychologist’s report was a cause of further increases in dyslexic students registering with the support service.

5.3.3 Support Duration

When students who had the data fields relating to the time at which they started support were isolated in the Historic sample, (N = 1465) more could be seen about support duration. Figure 5. 32 shows the frequencies for one to six years of support. At least 21% were on courses of four or more years. Other leavers with three or less years of support might have been on a longer course but not registered in the first year of study.

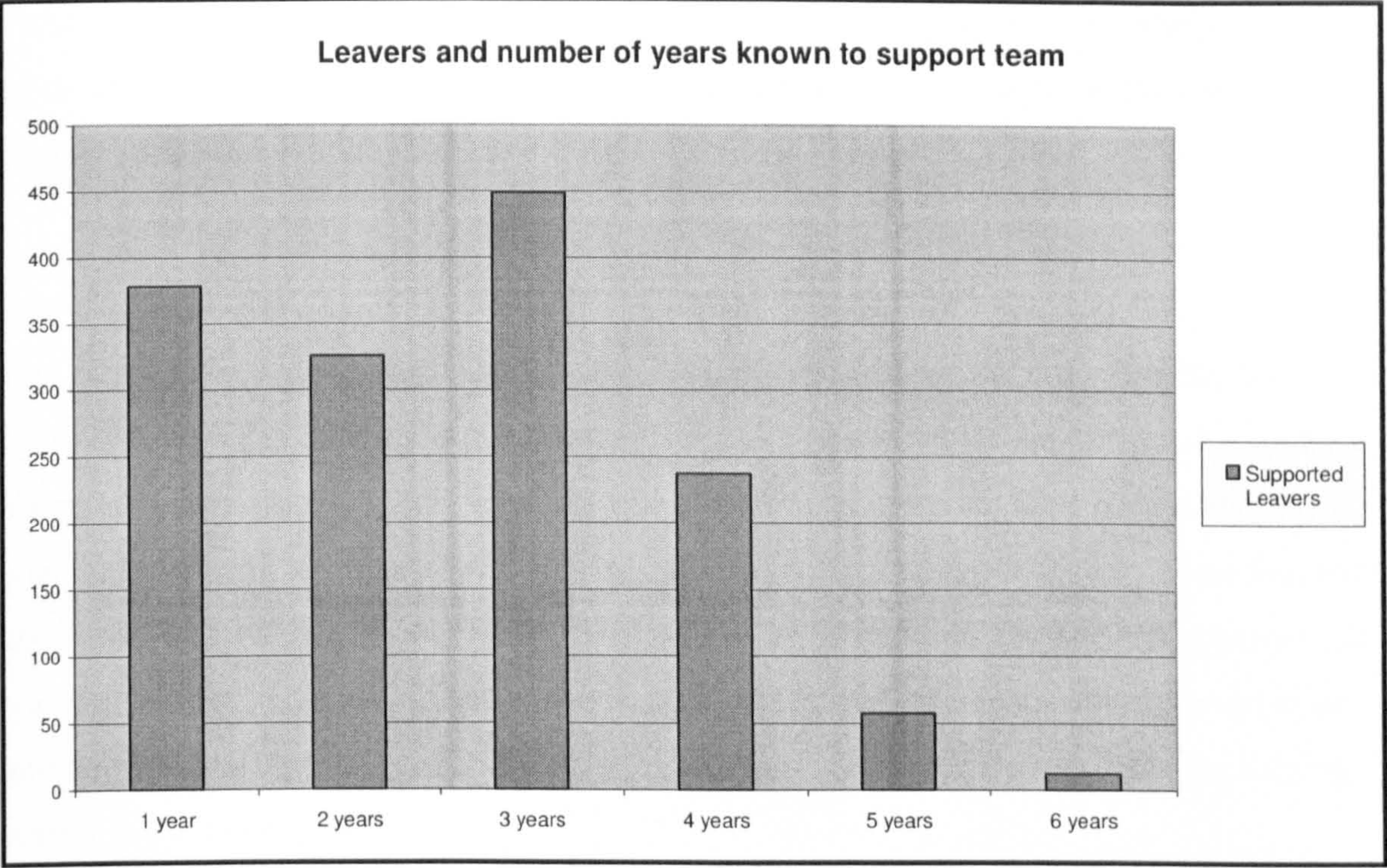


Figure 5. 32 Duration students known to support services during courses 1991/92–2003/04 [Leavers]

5.3.4 Level of Contact with the Support Team

Leavers’ data included frequency of contact in 1373 cases. For over two thirds of the students there was minimal contact (<5) with Student Services (see Figure 5. 33). There were slight gender differences, although it was notable that the very small number of students who had very high support needs (less than 0.5%) were almost always male.

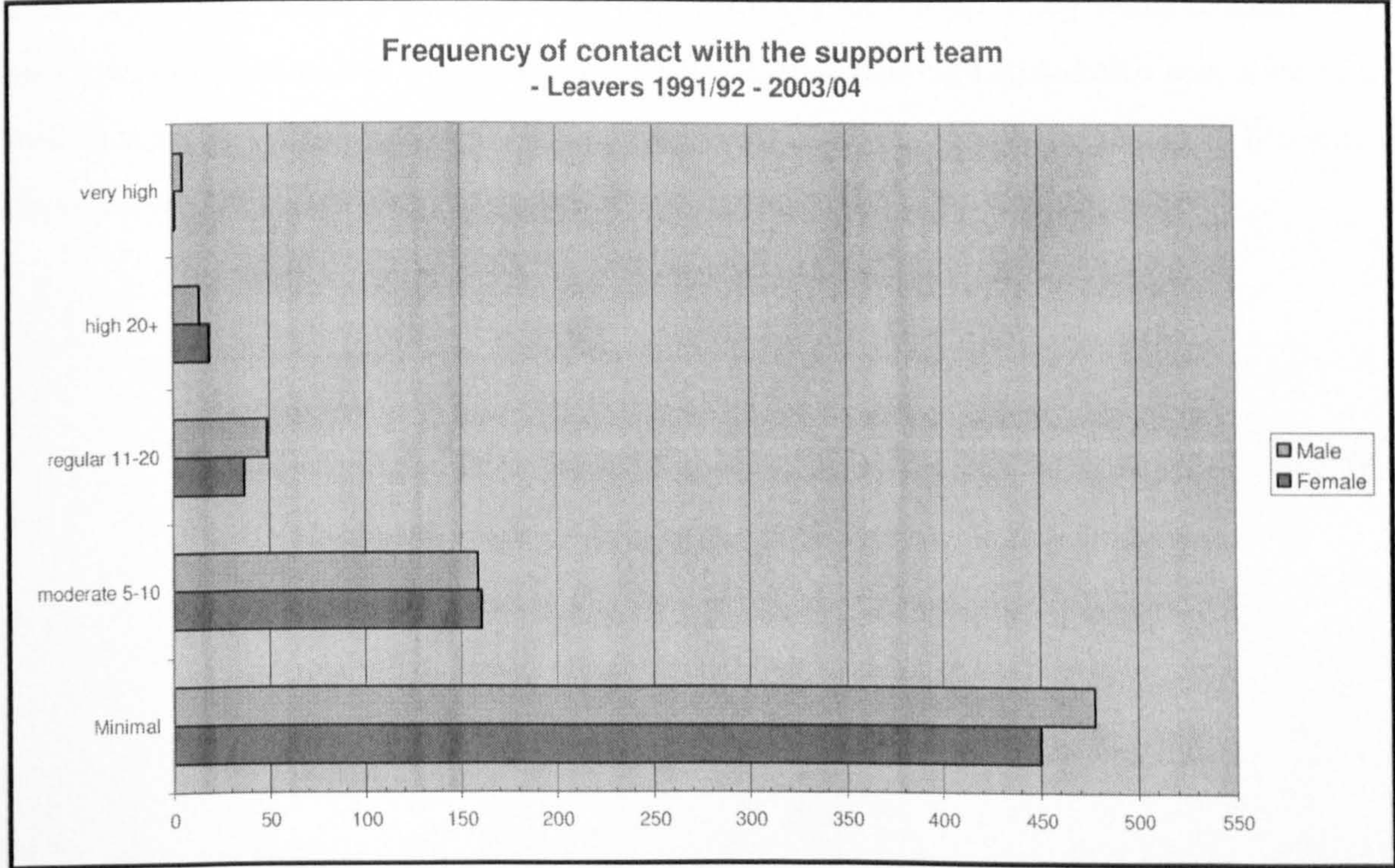


Figure 5. 33 Frequency of contact by gender, 1991/92-2003/04 [Leavers]

Ten students were coded as opting out of dyslexia exam arrangements, or arrangements were not applicable, all had an academic leaving code of 'OK'. The most common level of contact with Students Services for these students was a moderate 5-10.

5.3.5 Support Usage

One of the main supports provided by the university, rather than the body funding the DSA, was arrangements for exams. It was necessary to contact the support team to put the arrangements in place. There were two scenarios for registered students not taking advantage of particular exam arrangements; firstly having already chosen a course that had no exams, or secondly, choosing a course that played to known strengths so that extra time was not needed in the exam. Other registered students might decide against support in an attempt to prove that they could do the work without 'concessions' or to delay registering until it proved necessary.

Information on the use of study support was limited. But it was clear that exam arrangements were more frequently used than study skill sessions, as was shown using data 1998/99-2000/01 to give an impression of support usage before this study (see *Figure 5.34*). During this three-year period the Learning Skills module (M0506) only ran twice, rather than the normal once a year (see *App. 5.33*). The average number of students on the module, over the eight occasions it ran, was 13, making a total of 19 for the whole period – rather lower than might have been expected. Numbers for Group Study Skills session were also low, but the data is not completely reliable because although attendance was tallied for funded students (i.e. receiving DSA funding), other attendees who were known to Student Services, but unfunded may not appear in the figures.

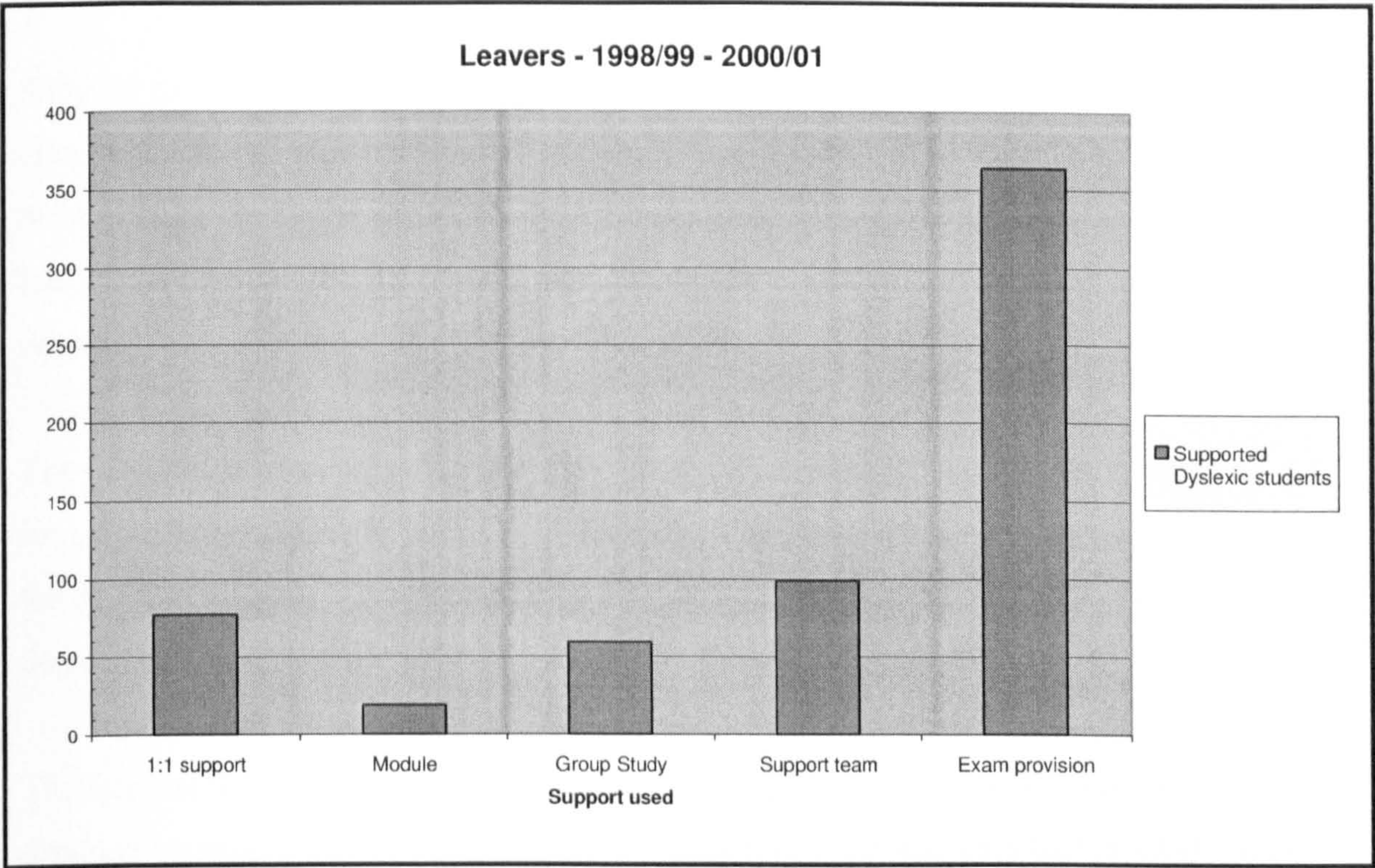


Figure 5. 34 Pre-research support usage, 1998/99-2000/01

For 26% of registered dyslexic students there were no indications of support provided in the Leavers’ data, or details of reasons for contact. Therefore, it was not clear whether the apparent low take up of support was real, or just an effect of the documentation procedures.

5.4 Summary of Key Findings

From 1994/95 to 2003/04, there was an increase in overall student numbers in both national and RI data. The proportion of dyslexics in the student population increased at all levels. While other disability numbers increased in line with the total student population, dyslexic student numbers grew by comparison, and came to represent 41% of disabled students or 2.2% of all first-year UK HE students. The RI had an above average number of students and an above average ratio of dyslexic students within that population, at 5.6%.

The RI had a consistently higher percentage of female dyslexics than the national average. The national first-year dyslexic student population was virtually evenly split by gender in 2003/04. RI leavers’ data was incomplete as not all students studying in that year had left by the end of the research, but trends suggest that the RI would have shown an increase in the number of female dyslexic students. About 78% of the men already knew of their dyslexia when applying to the RI, while 66% of women were recognised prior to university (see *Section 8.2.1 – Dyslexia and previous experience of learning*).

Subjects preferred by dyslexic students did not show a consistent pattern, but nationally the area of education and some courses such as languages were never common choices. The most popular courses at the RI for dyslexic students leaving in 2004 were healthcare, business, or humanities for females, and architecture, followed by engineering and business related courses for males (see *App. 5.21*).

The most common degree class for dyslexic students at the RI was 2:2, compared to a 2:1 for all students nationally. Joint field degrees did not have a negative impact on outcomes for dyslexic students, even though they involved meeting the academic standards of two departments (see *Section 5.2.4 – Field, Figure 5. 19 and Appendix 5.6*).

The introduction of DSA funding for postgraduate courses triggered an initial increase in disabled students studying at that level. Nevertheless dyslexics were half as likely to be studying at this level compare to the RI population overall. DSA for part-time undergraduates had an impact on the numbers studying part-time, although figures were still less than for the student population with no disabilities.

Generally, with increased numbers of dyslexic students, support became extra-curricular / pastoral rather than being provided by the departments. Exam arrangements, covered by the RI and not the DSA, were the most reported form of dyslexic support. The growing number of pre-course contacts with Student Services reflected a pro-active policy driven by links with the Admissions Department. As support became more formalised and funding increased, the most frequent reasons for contacting the support team related to administration procedures for accessing funding and arranging associated assessments.

5.4.1 Research Groups

The initial groups proposed as the basis for the research distinguished between three groups of students (see *Section 4.2.1 – Research groups*). There were those who made contact before their course (Group A), those who contacted support services at the start of their course (Group B) and those who were unaware of their dyslexia when starting their course (Group C). Group C were likely to have had no previous support, or at least no dyslexia-based support.

Various problems arose in refining groups and allocating students to them. The initial historic data groupings were derived from dates when courses started, when the students first registered with Student Services, and the reasons given for contacting the support team. It was possible to allocate 66% of the historic cases to a specific group. For 127 historic data cases there was insufficient information from which to deduce a research group, with an overlap between groups A and B (6%) which could not be distinguished. It was hard to differentiate those who intended to make contact at the start, but were distracted by other demands, from those who were initially attempting to study without support. Similarly, distinguishing Group B from C was problematic in 4% of cases, as some students did not progress to registered status. It was unclear, after screening, whether they had found that they were not dyslexic or simply felt that there were no relevant benefits from a formal assessment. Where the category was unclear, these cases were labelled as 'Registered – group unknown'. *Figure 5. 35* sets out the groupings identified, broken down by gender and *Figure 5. 36* presents the data annually.

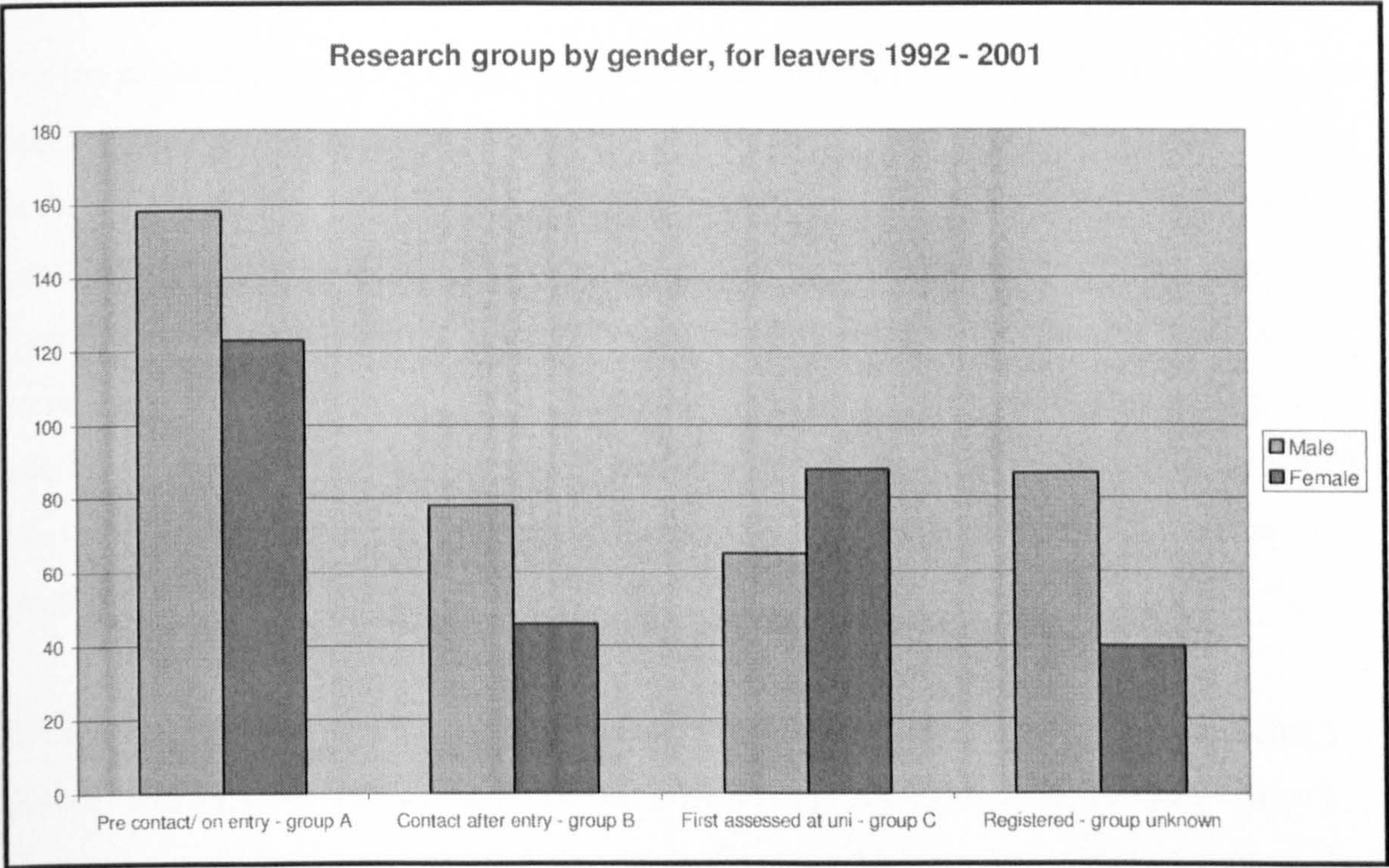


Figure 5. 35 Research groups by gender, 1992-2001 [Leavers]

As the dyslexic population increased, a growth was seen in the percentage that were Group A in most years, while the percentage in Group C dropped until it was fluctuating around 20% when the research began (see *Figure 5. 36*). These data showed the development of early or pre-contact with the RI.

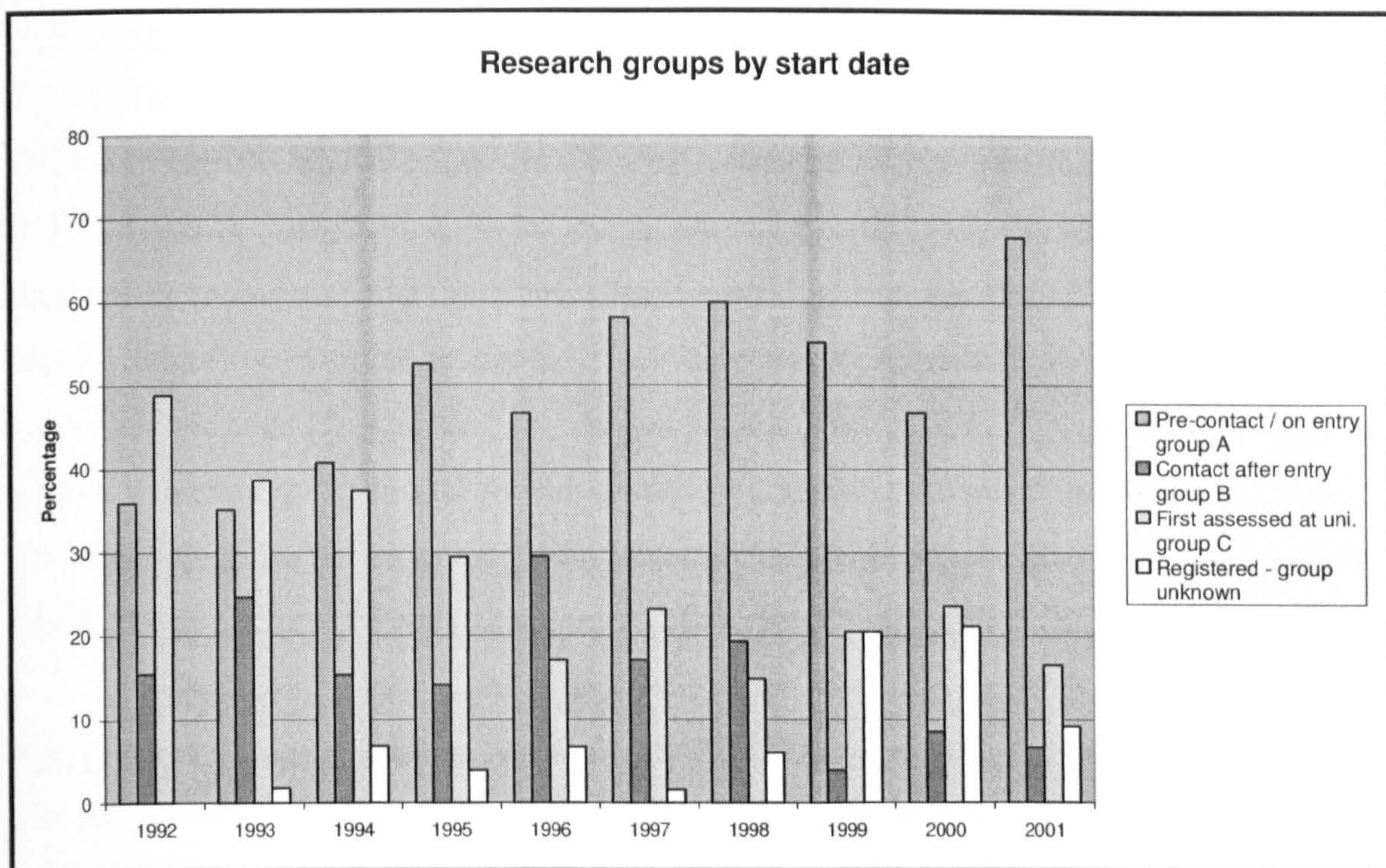


Figure 5. 36 Research groups as percentage by year, 1992-2001 [Leavers]

For the research measures, Group A was restricted to those pro-active students making pre-contact (see *Appendix 3.4 b.2*). There was a grey area between people who made contact at the start of the first term in Group A and some of Group B. This arose because, as a result of presentations in Induction Week, some students had gone off to locate a copy of their Educational Psychologist's report before formally going to the Support Services. In some cases, this became a drawn out process because other issues relating to starting at university were more pressing, certainly until the first assignment results. From the Leavers' data it was not possible to tell whether the date of first contact with the support team was the earliest contact.

In order to solve this problem, the groups were redefined after data gathering into four groups, and a further distinction was made within the group of students delaying contact. Group B was defined as those students who made contact within two terms, as soon as they could co-ordinate it with study. Those who delayed for longer, potentially intending to avoid dyslexia support, formed Group D (see *Section 4.2*). These final research groups were used when considering a representative sample for Phase Three.

5.5 Representative and Actual Sample

This section considers the characteristics of the RI dyslexic population data, and how well this is represented by the actual sample (see *Section 2.6.1* for related research questions RQ1 and RQ2). The factors influencing the sample include an age/gender split, department spread and also the derived final research groups (A, B, C, D) relating to past recognition of dyslexia and response to identification or previous support. The final representative sample was based on Leavers' data including 2000/01 course completions, although the data gathering for participants in Phase Two was underway from late 2000. The interview sample was influenced by the representative sample. Details of the sample size for each measure used for the research are covered at the end of this section.

5.5.1 Representative Sample

The RI population data proved quite distinctly different from national data, preventing generalisation from subsequent findings. Looking at the figures for the total RI student population, the gender ratio was 60:40 female: male (see *Figure 5. 7*), and the proportion of mature students (aged 25 and over) was found to have averaged 43% (see *Figure 5. 15*). In this context, the representative dyslexic sample was based on the data from 1992-Oct. 2001 leavers. To reflect the latest position at the start of the research period, percentages were modified in light of most recently available data for one year. For the 10-year period, there were 885 cases, 883 with gender data and 857 with age on entry as well (see *Table 5. 3* and *App. 5.34 – Single year of leavers*). The RI had shown a trend for the gender of dyslexic students to move from 36% female to closer to 50:50 over 10 years (see *Figure 5. 10* and *App. 5.7*).

	Leavers' sample 1992 – 2001 N = 857	Representative Sample – RI
Gender:		
Male	399	53%
Female	458	47%
	857	
Age:		
Und 21	495	58%
21-24	144	17%
(und 25)	(31)	(4%)
25 & Over	177	22%

Rounded

Table 5. 3 Representative sample, dyslexic students 1992-2001

The data showed that an over-25 year old group representing between a fifth and a quarter of the actual participants, with an equal gender split, would have been representative. There was no RI age within gender data to act as a basis for age groups broken down by gender quotas. The derived research groups related to past recognition of dyslexia and

time to adjust to the challenges once identified. The research groups were deduced from Leavers' data as part of this study and as such were approximations (see *Table 5. 4* or *App. 5.35* – last year of Leavers' data).

Dyslexia status – research groups	Leavers' sample 1992 – 2001 N = 857	Leavers' sample 1992-2001 only cases with research group data N = 629
Declared pre course - A	3%	4%
Declared start of course - B	30%	41%
Unknown start of course - C	20%	27%
Delayed declaring - D	20%	28%
	72%	100.00

Rounded

Table 5. 4 Representative Sample dyslexic students 1992-2001, final research groups

The sample needed to cover the range of study areas including architecture / built environment, science, business, subjects allied to medicine and engineering (see *Figure 5. 18*). Anything more detailed would have proved too restrictive. The target sample for this research is shown in *Table 5. 5*.

	Representative Sample – RI
Gender: Male Female	52-53% 47-48%
Age: Und 21 21-24 25 & Over	60-65% 15-17% 17-22%
<u>Dyslexia status</u>	
A	4-7%
B	41-49%
C	17-28%
D	27%

Table 5. 5 Representative Sample as percentages: gender, age on entry and final research groups

5.5.2 Actual Sample

All the data from historical and participant sources were held in an SPSS database (see *App. 5.36* for a breakdown). In the actual sample used, the gender ratio reflects the RI and HE population as a whole and not the ratio of the dyslexic students known to Student Services (see *Table 5. 6* and *Table 5. 8* for gender detail breakdown). Mature students were over represented in the sample in terms of the RI dyslexic population. The sample covered the range of study areas including healthcare, business, science, humanities, engineering and architecture, but no quota was used.

	UK – HE students	RI	Representative Sample – RI	Actual Percentage	Actual sample N = 269
Gender:					N = 268
Male	44%	41%	52-53%	39%	104
Female	56%	59%	47-48%	61%	164
Age:					N = 197
Und 21	80%	39%	60-65%	56%	110
21-24	9%	18%	15-17%	15%	29
25 & Over	11%	43%	17-22%	29%	58

Table 5. 6 Representative and actual samples gender and age

The students who were in contact with the support team before the start of their course appeared more willing to take part in the research (see Table 5. 7). Those who delayed contacting the team also tended to be unwilling or lacked time to take part once they did register.

<u>Dyslexia status – research group</u>	Representative	Actual Percentage	Actual sample N = 237
Declared pre course - A	4-7%	10%	24
Declared start of course - B	41-49%	51%	120
Unknown start of course - C	17-28%	29%	68
Delayed declaring - D	27%	11%	25

rounded

Table 5. 7 Representative and actual samples, research group

The data was broken down further by gender (see Table 5. 8) to give more detail of the actual sample used.

Actual Sample	269			Percentage	
Gender	268	Male	Female	Male %	Female %
		104	164	39	61
Age:	197	64	133		
Und 21		40	70	63	53
21-24		11	18	17	14
25 & Over		13	45	20	34
Dyslexia group	237	88	149		
Declared pre course - A	24	11	13	13	9
Declared start of course - B	120	47	73	53	49
Unknown start of course - C	68	18	50	20	34
Delayed declaring - D	25	12	13	14	9

Table 5. 8 Actual Sample dyslexic students

The total database of 1719 cases was broken down by measure and gender (see Table 5. 9, App. 5.36).

Measure	Total	male	female	Notes
<u>Phase one</u>				
Historic data	1647	830	802	<i>Referenced in Chapter 5</i>
Leaving details	1450	747	701	<i>Referenced in Chapter 5</i>
<u>Phase two</u>				
WAIS IQ indices	72	21	51	<i>Referenced in Chapter 6</i>
<u>Main Survey</u>				
Dyslexia background	160	56	104	<i>Referenced in Chapter 7 and 8</i>
BDA	135	48	87	<i>Referenced in Chapter 6</i>
Course (Modules)	141 116	51 37	91 79	<i>Referenced in Chapter 7</i> Course - once, Modules could be repeated
MI	141	50	91	<i>Referenced in Chapter 6</i>
VARK	141	42	92	<i>Referenced in Chapter 6 and 7</i>
WAY	128	43	83	<i>Referenced in Chapter 7</i>
Open Q's	163	61	102	<i>Referenced in Chapter 7 and 8</i>
<u>Personality Survey</u>				
NEO-FFI, Big-5	96	33	63	<i>Referenced in Chapter 6</i>
<u>Support Survey</u>				
Equipment	135 (122)	40	82	<i>Referenced in Chapter 7</i> 130 had received their report 128 provided assessment data 122 had received equipment
Support	153	53	100	<i>Referenced in Chapter 7</i>
Either Equipment or Support	161	57	104	<i>Referenced in Chapter 7</i>
PIP page access permission given	(202) 196	88	108	<i>(5 gave permission but there was little relevant PIP data)</i>
<u>Phase three</u>				
Interviews	47	16	31	<i>Referenced in Chapter 7 and 8</i>
<u>All</u>				
	43			Main Survey and Personality
	16			Main Survey and interview
	7	2	5	All - measures and interview

Table 5. 9 Actual measure sample breakdown

For the ‘essential’ main measures the sample size was 121; this meant that the students had given a complete set of data, consisting of the Dyslexia Background, BDA Checklist, Course Details, VARK, and MI measures. In all, 161 people completed some part of the Equipment or Support measures, of which 66 did both Main and Support measures. Ninety-five people joined the research by the Support alternative route (see *Figure 4.1*) rather than completing these measures in addition to the main measures. The following chapter focuses on statistical analysis of the questionnaires in relation to dyslexia and personality.

Chapter 6 – Analysis of Results in Relation to Dyslexia and Personality

6.1 Introduction

This chapter builds on knowledge obtained in the previous chapter, concerning the nature of the dyslexic population, and what constitutes a representative sample (RQ1). It addresses the first research aim of determining the characteristics of the dyslexic population at the RI (RQ2). Excel and SPSS were used to analyse the data, considering patterns within intelligence, dyslexia, learning preferences and personality.

The findings analysed in this chapter are based on the measures undertaken by dyslexic students during their studies (see *Section 3.3.2 – The Questionnaires*), supplemented by the WAIS-III IQ test details from Student Services records, where they were available to this research. It was hoped that the Multiple Intelligences self-test (MI) (see *App. 3.4 i.3*) and NEO Five Factor Inventory (NEO-FFI or Big-5) covering personality (see *App. 3.4 j*) would illustrate how the strengths and weaknesses manifested themselves in personality, life style choices, and study strategies. The Support Survey and some parts of the Main Survey are analysed in Chapter 7.

Descriptive statistics are provided for each set of data. Correlations are then used to explore relationships between variables, followed in most cases by factor analysis or Hierarchical cluster analysis to group variables further. Factor analysis is not part of the statistics armoury used to test experimental hypotheses; rather it is an exploratory tool (see *Sections 3.2.3* and *Section 3.3.4*). Some factor analysis addresses the validity of the design constructs for the sample population, while others look for latent variables based on commonality between variables. Cluster analysis techniques, Two-step, K-mean (Optimisation, Quick cluster) or Hierarchical (case) were adopted to look at ways of grouping cases rather than variables.

6.2 The Measures

Relationships between intelligence measures, literacy scores, results of the BDA Checklist and Learning Mode Preferences (VARK) (see *Section 3.3.2 – Learning Mode preferences*, for details) plus Big-5 (see *Section 3.3.2 – Personality Survey*) are analysed in this chapter.

There were 269 respondents; although not all of them went on to complete all questionnaires (see *App. 6.1*). In all 43 students completed both questionnaire sets and went on to complete the personality inventory. A further 16 completed one questionnaire-set and Big-5. The incomplete response sets (see *Section 4.2.1 Sampling summary and App. 6.3*), limited the statistics that could be meaningfully applied to the data. For each questionnaire (see *Table 5.9*), the data could be broken down by gender, and were derived from two main sources (see *Figure 4.1, App. 6.2*).

6.2.1 Intelligence

Measures of intelligence such as WAIS-III show an individual's capacity to complete test items, which can then be related to the likelihood of certain academic outcomes, but further information is needed to determine precise difficulties (see *Section 2.2.1*). The MI Inventory was therefore used to explore a wider range of 'intelligences' (see *Section 3.3.2 – Intelligence*, for details).

WAIS

The WAIS results did not necessarily reflect the participants' perceptions or experience of studying. The data analysed here differs slightly from that in the previous chapter and other sections, as the combined Leavers' and Participants dataset was used for WAIS and WRAT (N=1719). Records indicated that the IQ tests used were documented in 1087 cases, of which 795 were a form of WAIS, although only 327 were WAIS-III. It was rare to find all the totals for the sub-tests that make-up the WAIS-III indices in reports (see *App. 3.4*). As a result, it was not possible to run descriptive statistics for individual questions or sub-tests.

The model for the WAIS indices scores follows normal distribution, with a mean of 100 and standard deviation of 15. All available indices' standard scores (scale 50-150), including unmatched and matched, were initially analysed (see *Table 6.1*). Of the 180 students whose report included some WAIS-III indices information, all four indices were given in 72 of those reports [matched]. There were reports on 109 females and 71 males,

with at least one index, of which 21 males had ‘matched’ indices. The ‘unmatched’ cases (N=108), with an incomplete set of indices, usually reported the extreme values for one or two indices. For the population at large one would expect little variation between the indices scores. The indices means varied substantially for this sample. The Verbal Comprehension Index (VCI) and Perceptual Organisation Index (POI) means fell in the ‘high average range’, while Processing Speed Index (PSI) and Working Memory Index (WMI) were in the lower half of ‘average’.

Statistics N = 180	Verbal Comprehension score	Working Memory score	Perceptual Organisation score	Processing Speed score
Valid	87	153	85	138
Missing	93	27	95	42
Mean	114.18	89.97	110.52	91.73
Mean as percentile	82	25	76	29
Std. Deviation	12.46	11.95	16.71	12.51
Minimum	83	57	75	62
Maximum	147	128	147	133

Table 6. 1 WAIS III indices from reports in which any indices were present [all]

Frequency statistics were repeated for the unmatched (see *Table 6.2* and *App. 6.4*) and matched sub-sets (see *Table 6.3* and *App. 6.10*). The unmatched indices showed a higher mean score in the VCI of 119.13, verging on the ‘superior’ range of scores (see *App. 6.5-App. 6.9* for indices frequency charts). POI dropped into the ‘average’ band. WMI, illustrating the focus on extreme scores, was skewed towards lower scores with a mean of 87.10 in the ‘low average’ range. Of WMI scores, 53% were found in unmatched indices cases.

Statistics N = 108	Verbal Comprehension score	Working Memory score	Perceptual Organisation score	Processing Speed score
Valid	15	81	13	66
Missing	93	27	95	42
Mean	119.13	87.31	106.46	88.41
Mean as percentile	90	19	67	22
Std. Deviation	18.95	10.57	24.89	11.57
Minimum	89	57	75	62
Maximum	147	128	142	124

Table 6. 2 WAIS III indices from reports in which any indices were present [unmatched]

The matched data showed the same overall patterns seen in the descriptive statistics above (see *Table 6.3* and *App. 6.10-App. 6.14* for charts, *App 8.37* for indices details and age identified). The VCI mean actually dropped and POI rose with this sample (see *App. 6. 15*). The two the most common PSI standard scores were 93 then 86 (see *App. 6. 16*).

Statistics N= 72	Verbal Comprehension score	Working Memory score	Perceptual Organisation score	Processing Speed score
Mean	113.15	93.15	111.25	94.78
Mean as percentile	81	32	77	36
Std. Deviation	10.54	12.75	14.91	12.65
Minimum	83	62	75	68
Maximum	142	127	147	133

Table 6.3 WAIS III indices, full set of indices [matched]

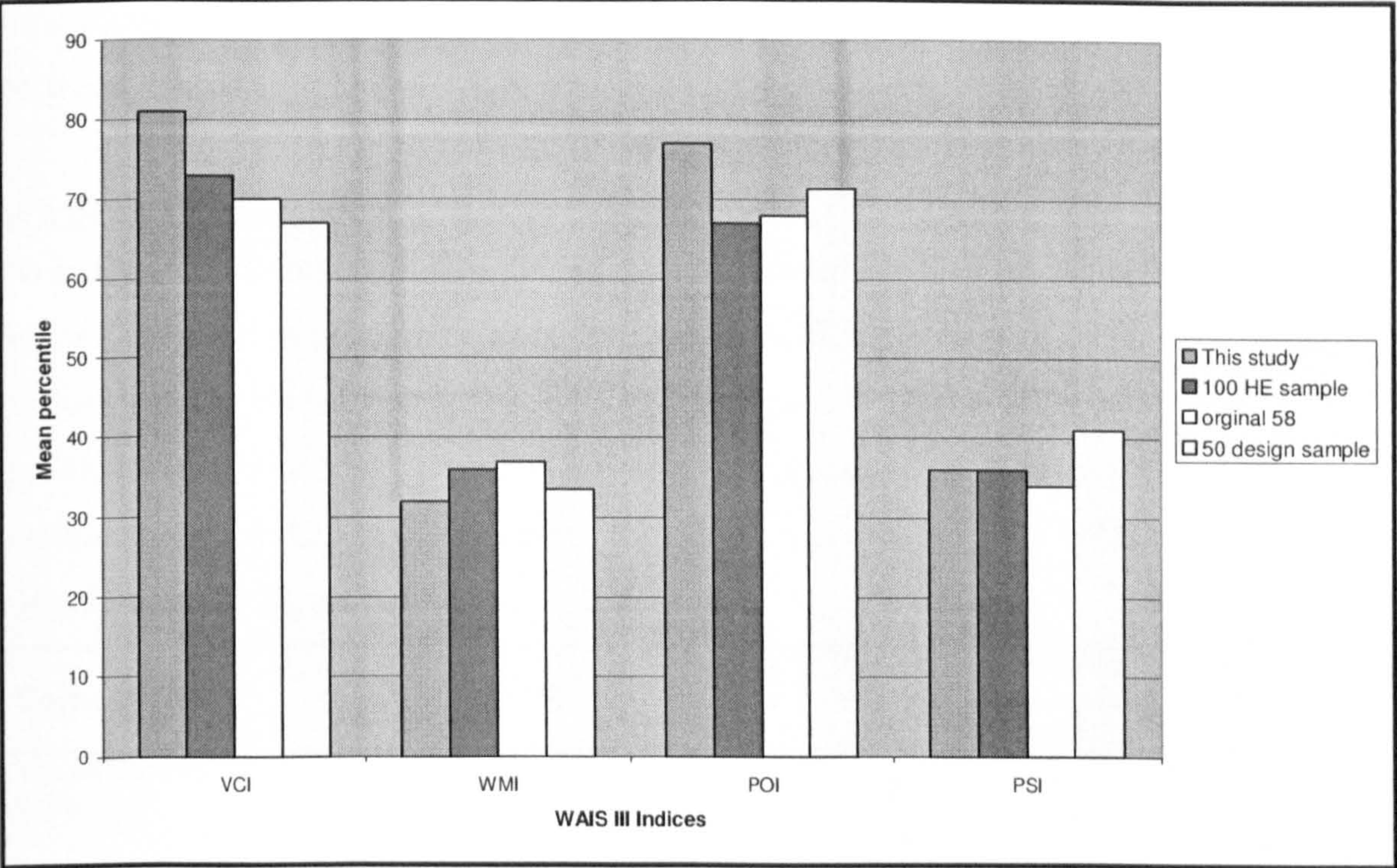
High VCI scores indicate an ability to express ideas in words orally and good factual knowledge. Low WMI scores are associated with a variety of difficulties, including coordination, sequencing, oral abilities and distractibility, which affect high order skills, including reasoning abilities and learning. Low PSI scores indicate poor thought and motor response speeds for visual tests relating to routine tasks, which could be expected to impact on reading and efficiency of writing (Grant, 2001). WMI and PSI can be seen as ‘mediators of learning efficiency’ in terms of cognitive function because the component skills have been found to be important in learning. The POI relates to visual-spatial motor coordination and non-verbal reasoning and problem solving skill.

Taking a standard score of less than 85 ($\leq 15^{\text{th}}$ percentile) as low (1 standard deviation) this study showed 4% of cases low on both WMI and PSI, a further 4% with both weak, and another 19% showed either a weakness in WMI or PSI (see *App. 6.15* and *App. 6.16*, and *App. 8.37*). Only PSI had one case of two standard deviations below average.

WAIS independent t-test

An independent *t*-test between matched and unmatched data showed that WMI and PSI not only had the lowest means, but were most affected by the exclusion of incomplete indices sets (6% and 7% of variance). The means for unmatched and matched data for these indices differed significantly (see *App. 6.17* and *App. 6.18*). To prevent distortion, due to incomplete sets of indices, a matched group was used for further statistics and subsequent factor and cluster analysis statistics.

The mean standard scores for the 72 participants with matched indices were taken as percentiles and compared to the WAIS indices profiles from Grant (2005, 2001) (see *Figure 6.1*). Grant (2001) emphasises the visual aspect of PSI tests and the auditory elements of WMI tasks. He found weaknesses in WMI and PSI in ‘at least 80% of cases of dyslexia.’



Original 58 = Grant (2001)
100 HE = Grant (2004a)
50 Design = Grant (2004a)

Figure 6. 1 WAIS-III index means for RI dyslexic students, also showing Grant’s 3 samples

A strong positive correlation between indices would normally be anticipated. In these samples the score differences were such that averaging the indices to provide the Verbal and Performance IQ (VIQ, PIQ) appeared meaningless and would only obscure the difficulties experienced (see Figure 6. 1 and Table 6. 4).

WAIS ANOVA

To analyse the relationships between the matched WAIS indices, an Analysis of Variance (ANOVA) was used. WAIS indices were usually expected show a close relationship. The one-way repeated ANOVA showed there was a significant effect for ‘WAIS indices’ [$F(3,213)=62.53, p<.0005$, partial eta squared =.47] (see App. 6.19). Pallant (2005) cites the proposed guidelines of Cohen (1988) for Partial Eta squared effect size, were .01 = small, .06 moderate, .14 large effect. At this point it was known that there was a significant difference, but not which indices it was between. A Bonferroni Post hoc test showed significant difference between all indices with the exception of VCI/POI (high scores) and WMI/PSI (low scores) (see App. 6.20). WMI/PSI the ‘mediators of learning efficiency’ have values that are similar and were reliable. All other variations between indices pairing (see Figure 6. 1) are significant and support the ‘jagged’ profile as part of identifying dyslexia. These differences indicate VIQ (VCI/WMI) and PQI (POI/PSI)

should not be used in dyslexia assessment reports because of the significant differences between indices.

WAIS – Correlations

To analyse the strength and direction of any relationship between the matched WAIS indices, the Pearson product-moment correlation coefficient was used. Pearson showed a positive correlation between POI and Processing Speed (PSI) ($r = .41$, $r^2 = .17$, $N = 72$, $p < .0005$) (see *Table 6. 4*). Higher POI scores were associated with higher PSI. This explained 17% of the shared variance. Correlation was seen between WMI and POI ($r = .36$, $r^2 = .13$, $N = 72$, $p < .0005$).

Correlations	N = 72	Verbal Comp index	Working Memory index	Perceptual Organisation index.	Processing Speed index
Verbal Comprehension index	Pearson Correlation	1	.18	.18	-.09
	Sig. (2-tailed)		.133	.134	.458
Working Memory index	Pearson Correlation		1	.36(**)	.14
	Sig. (2-tailed)			.002	.161
Perceptual Organisation index	Pearson Correlation			1	.41(**)
	Sig. (2-tailed)				.000
Processing Speed index	Pearson Correlation				1
	Sig. (2-tailed)				

** Correlation is significant at the 0.01 level (2-tailed).

Table 6. 4 WAIS standard score indices – Pearson Correlations [matched]

Pearson correlation showed two correlations between the WAIS indices of .3 or above. The positive correlation and similar values, i.e. high or low together, expected for the components of Verbal IQ (VCI and WMI) were not seen. Factor analysis of the matched indices scores was undertaken.

WAIS – Data reduction

Factor analysis, in the form of Principle Component Analysis (PCA) (Field, 2005 p. 619; Pallant, 2005 pp.172-3), showed the Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) score was rather low, .54 (see *App. 6.21*), making the data marginal but acceptable for factor analysis. Using Eigen values of greater than one and suppressing correlation values below .3 resulted in two components to be retained (see *Table 6. 5*).

Total Variance Explained						
Component (Eigenvector)	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	1.67	41.71	41.71	1.67	41.71	41.71
2	1.10	27.54	69.25	1.10	27.54	69.25
3	.73	18.14	87.39			
4	.50	12.61	100.00			

Extraction Method: Principal Component Analysis.

Table 6. 5 Matched WAIS total variance explained, initial values

The indices data were then subjected to a Varimax rotation, which revealed two distinct components (see *Table 6. 6*). These partly reflected the Performance IQ (POI and PSI) and the Verbal IQ (VCI and WMI) in the WAIS-III design, with the exception of WMI. The rotated component matrix shows the loading of variables contributing to the components. Any variable value of .44 or greater can be considered relevant to the component definitions according to Comrey (1973) cited in Miller *et al.* (2002, p. 179).

The loading values in *Table 6. 6* show the strength of the variable’s role in defining each of the components identified. A negative loading indicates that the variable had an inverse relationship with the rest of the factor or component. Sample size affects the point at which loading values should be considered important. For this measure, the sample size was 72, indicating that a loading of .62 or greater would be of interest, based on Stevens (1992, p. 382) cited in Field (2005). WMI falls below this loading, although it was stronger in Component-1. The first component reflects Performance IQ (PSI and POI), which includes the ability to handle non-verbal reasoning, visual-spatial skills and the speed of processing these types of tasks. VCI was the key variable in the second underlying component, which did not reflect Verbal IQ. Component-2 included the ability to express ideas in words, answer oral questions and conceptualize in a verbal form. The loadings for the WMI variable indicated sequential processing and distractibility could influence both components. The degree of rotation needed was notable (see *App. 6.22*).

Rotated Component Matrix(a)	Component	
	1	2
Processing Speed standard score	.82	-.29
Perceptual Organisation standard score	.79	.27
Working Memory standard score	.53	.50
Verbal Comprehension standard score	-.04	.89
Rotation Sums of Squared Loadings		
Total	1.58	1.19
% of Variance	39.46	29.79
Cumulative %	39.46	69.25

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

Table 6. 6 WAIS pattern / structure coefficients [matched]

WAIS – Cluster analysis

Two-step cluster analysis was used to see how the 72 participants could be grouped by their score for each index. This gave two clusters of cases based on WAIS variables (Wcl 1 and Wcl 2). Both clusters show high VCI, but were distinguished by either having the overall highest score in POI and average WMI and PSI, or having VCI highest, average POI and very low WMI and PSI score (see Table 6. 7). All mean scores dropped between cluster Wcl 1 and Wcl 2.

Centroids		Verbal Comprehension index	Working Memory index	Perceptual Organisation index	Processing Speed index
- Cluster -		Mean	Mean	Mean	Mean
N = 41	Wcl 1	116.32	99.00	118.07	101.22
N = 31	Wcl 2	108.97	85.42	102.33	86.26
Combined		113.15	93.15	111.25	94.78

Table 6. 7 WAIS Two-step Centroids and Intelligence quotient means [matched]

Grant (2005) indicated that he would expect 80% of dyslexic students to have both low WMI and PSI, while this data gives a cluster with a low means for both indices for 43% of the sample. Of Wcl 2 (N=31), 15 had PSI as the lowest score, 15 WMI, and one equal scores (see App. 8.38). In addition to a good ability to express ideas in words and to reason verbally, Wcl 2 mean scores show a slow speed of thinking about and doing either non-verbal tasks, or oral, sequential processing and number work. This cluster might well be easily distracted, based on low WMI. Wcl 1 was less clear-cut, indicating high ability in verbal conceptualisation but formed of cases where POI showed the highest scores for 23 out of 41 participants.

In summary, the PCA factor analysis only supports a Performance IQ component as used in WAIS-III. A moderately significant positive correlation between POI and PSI existed,

but the means were substantially different. The relationship between VCI and WMI was absent, although a significant positive relationship existed between POI and WMI. The participants clustered into higher and lower scoring groups.

Multiple Intelligence Questionnaire

To assess the students’ perceptions of their own intelligences, a Multiple Intelligence Questionnaire by McKenzie (1999, 2002), based on Gardner, was used (see *Section 3.3.2 – Intelligence*). There are no normalised data for this measure. Gardner’s intelligences were referred to as ‘given’ in this analysis. Alternative groupings were determined using a Hierarchical cluster analysis with Ward linkage on the individual questions (see *Section 6.2.1 – MI Alternative sub-groups*).

Initially an investigation of the individual questions ‘Yes/No’ responses was undertaken to determine whether McKenzie’s questions showed any internal correlation to either his own three domains (Analytical, Introspective and Interactive) or to Gardner’s ‘intelligences’. For some questions there was a high frequency of either ‘Yes’ (see *App. 6. 23*) or ‘No’ (see *App. 6.24*). ‘*I learn by doing*’ had the greatest number of ‘Yes’ responses, over 92% (Kinaesthetic). The mental arithmetic question had one of the highest percentages of no responses (87%). The total number of affirmative responses to the 90 questions was calculated for each case.

MI given sub-totals – descriptive

The nine ‘given’ intelligences totals (see *Appendix 3.4 i.2* for descriptions of intelligences) were analysed for the 141 completed surveys. Overall, Verbal Intelligence had a low mean of 3.36 and a mode of 3, while Intrapersonal showed the highest mean of 7.74 with a mode of 10 (full marks) (see *Table 6. 8*).

Statistics	Naturalist	Musical	Logical	Existential	Interpersonal	Kinaesthetic	Verbal	Intrapersonal	Visual
Mean	5.10	5.04	5.32	5.58	4.43	6.22	3.36	7.74	5.15
Median	5.00	5.00	5.00	5.00	4.00	6.00	3.00	8.00	5.00
Mode	6	4	7	5	4(a)	7	3	10	6
Std. Deviation	2.54	2.14	2.05	2.50	2.25	2.50	2.06	2.24	2.16
Skewness	.02	-.02	-.18	-.01	-.09	-.25	.83	-.96	.15
Kurtosis	-1.00	-.54	-.52	-.69	-.80	-.74	.76	.32	-.50
Minimum	0	0	1	0	0	0	0	1	0
Maximum	10	10	10	10	9	10	10	10	10

a Multiple modes exist. The smallest value is shown

Table 6. 8 Multiple Intelligences – mean and mode scores for participating dyslexic students

The negative skews of Kinaesthetic (-.25) and especially Intrapersonal (-.96) showed a trend that was above the mid-point (see *Figure 6. 2*). Intrapersonal characteristics include awareness and monitoring of thought process, actions, inner feelings and behaviours – in effect, meta-cognition.

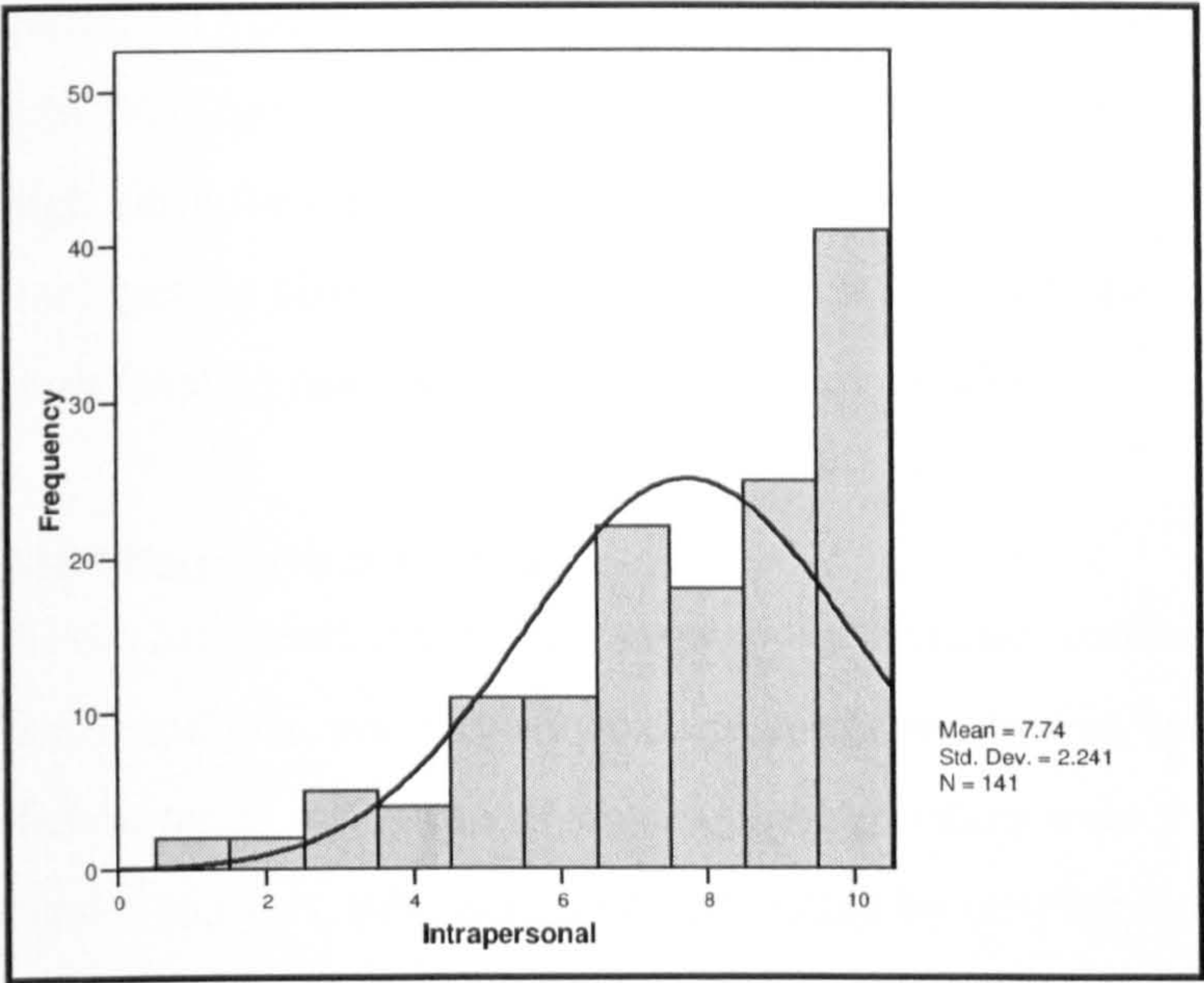


Figure 6. 2 MI Intrapersonal plot

Verbal relates to linguistic strengths, using reading, writing, and speaking – including humorous word play – to aid remembering and communicating. The positive skew of Verbal towards the lower scores (see *Figure 6. 3*) suggests a weakness in that area, combined with strengths in self knowledge, and practical hands-on skills. Verbal was the only skewed intelligence that also showed a gender difference (see *Section 6.2.1 – Gender differences in intelligence and App. 6.41*).

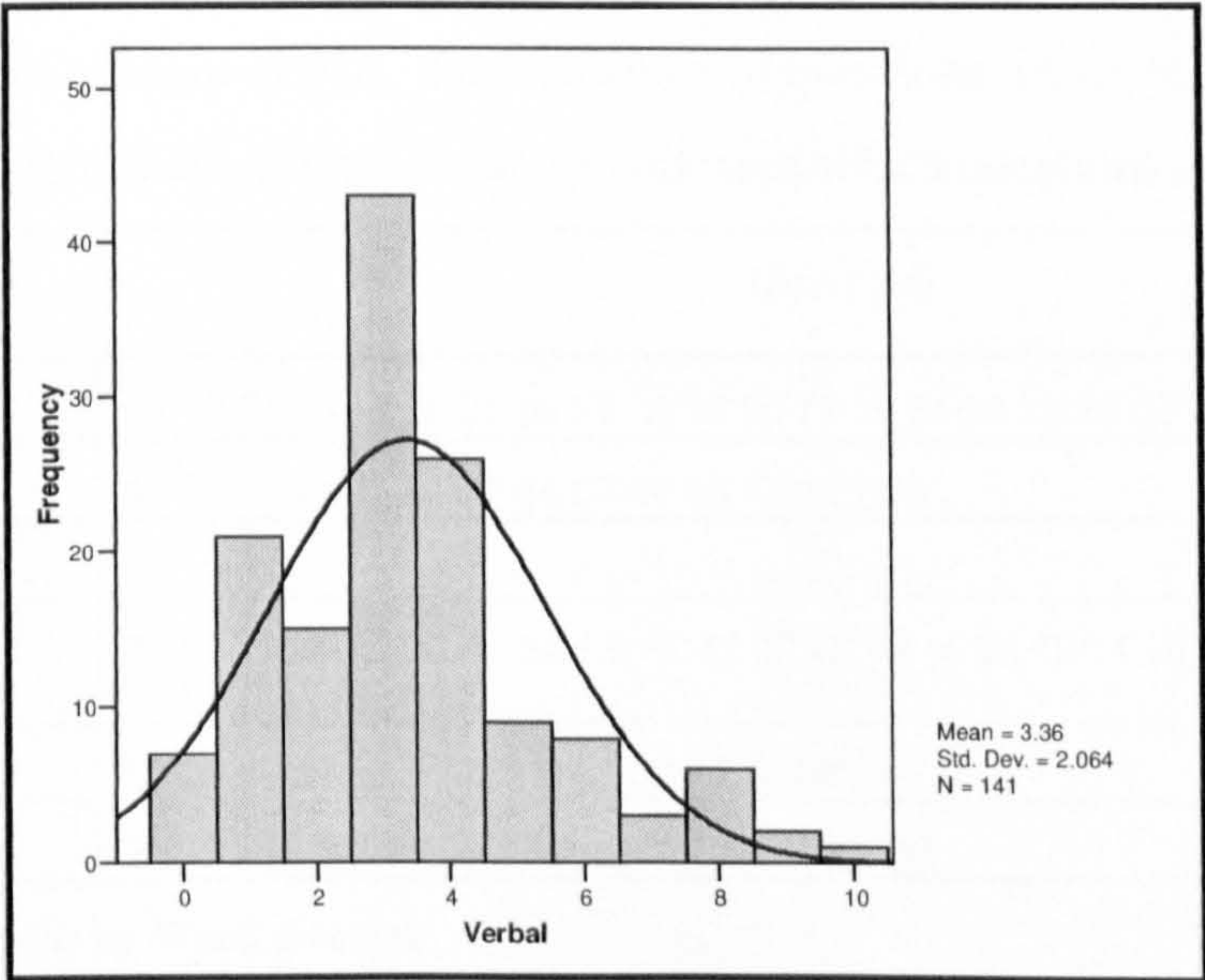


Figure 6. 3 MI Verbal plot

MI ANOVA

A one-way repeated ANOVA, conducted on the MI given totals, showed a statistically significant difference. As sphericity was violated (see *App. 6.25*), Greenhouse Geisser correction was used [$F(7.27,1017.89)=53.96$, $p<.0005$, partial eta squared =.28]. This partial eta squared result indicates a large effect size (see *Appendix 6.2.2 – MI repeated ANOVA, App. 6.26 and App. 6.27*). Post hoc tests for dyslexic students showed that the high mean for Intrapersonal Intelligence and low for Verbal Intelligence. These intelligences also had the greatest number of significant differences from the means for the other intelligences (see *App. 6. 28 and App. 6.29*).

MI Alternative sub-groups

As the MI question variables were categorical, not continuous, it was not appropriate to use factor analysis, nor could Two-step cluster analysis be used as the variables were also dichotomous. Once possible clusters of variables were identified, using Hierarchical cluster analysis, sub-totals were calculated by tallying the questions and dividing by the number of questions. These were then compared to those for the proffered nine intelligences.

Hierarchical cluster analysis with Ward linkage showed early clustering in the dendrogram (see *App. 6.30*). Five new variables were calculated for each case by tallying the responses for each question within a grouping (see *Table 6. 9*) to give sub-totals which were subsequently divided by the number of questions. Division by the number of questions meant that for cases where all questions were answered ‘Yes’, each sub-total had the same scale with a maximum score of one. The sequence of questions, as taken from the dendrogram, was significant as the proximity indicated which questions clustered together.

Ward linkage derived Intelligences	Questions
Ward Intrapersonal	60 73 74 30 18 76 81 32 77 78 36 80 72 79 31 38 22 28 62 71 75 50
Ward Anti-verbal	33 64 25 44 48 66 87 84 67 68 65 15 45 70 9
<i>Ward non-polarised</i>	
Music/interpersonal <i>plus</i>	29 86 11 26 23 90 21 24 1 6 41 47 42 43 49 16 20 13 14 46 63 69 19
Kinaesthetic <i>plus</i>	55 59 53 56 83 51 58 82 17 52 12 89 88
Naturalist <i>plus</i>	2 8 4 3 10 5 7 35 54 27 34 37 57 85 40 61 39

Table 6. 9 MI questions by Ward clusters

The five clusters were labelled based on the original intelligences that covered the most questions included in them (see *App. 6. 31*). The first cluster, Ward’s Intrapersonal

category, was a distinct group, clustering in a short distance with only a single top level join to all the other clusters (see *App. 6.30* and *App. 6.32* for response type and percentage within Ward categories). The last three clusters on the diagram were siblings (Ward’s Music / Interpersonal, Ward’s Kinaesthetic and Ward’s Naturalist) all coming under a common ‘parent’. The parent cluster joined with Ward’s Anti-verbal, which finally combined with Ward’s Intrapersonal.

‘Yes’ was the most frequent response for all questions in the Ward’s intra cluster and ‘No’ for Ward’s Anti-verbal questions, with particular emphasis on writing. Questions in the groups with the common parent cluster were unlikely to show a high frequency for being answered ‘Yes’ or ‘No’, and no group polarised towards responses of ‘Yes’ or ‘No’. The means and the frequencies were calculated for the Ward groupings (see *Table 6. 10*). The Ward category of Anti-verbal did not meet the normal distribution criteria of skewness <1.

Statistics N= 141	MI Ward intrapersonal	MI Ward anti- verbal	MI Ward music inter	MI Ward kinaesthetic	MI Ward naturalist
Mean – ‘yes’	.78	.22	.48	.63	.49
Std. Deviation	.17	.16	.18	.22	.23
Skewness	-.89	1.02	-.26	-.07	.17
Minimum	.23	.00	.09	.08	.06
Maximum	1.00	.73	.83	1.00	1.00

Table 6. 10 MI questions Ward sub-totals frequencies

The dichotomous nature of the questions meant cluster analysis could not identify the structure of nine intelligences or three domains, as proposed by McKenzie. The strongest responses were found for Ward’s Intrapersonal, where ‘Yes’ covered 78% of the responses, and Ward’s Anti-verbal category, with the equivalent high percentage of ‘No’ responses for individual questions.

Ward’s Intrapersonal category was most distinct, covering the strengths of learning by doing, imagining, and engaging with tasks. This cluster demonstrated a need for a holistic approach, for fairness, opportunity to work alone and enjoyment of music.

The negative responses for Ward’s Anti-verbal category questions indicated a dislike of many types of puzzles, especially those that are word related, and a reluctance to write for pleasure or to speak in public.

The common parent cluster covered: firstly, Ward's Music / interpersonal category which indicated a positive response to the topics of organisation, structure and sociability; secondly, Ward's Kinaesthetic category, which elicited mostly positive responses relating to creativity, visualisation, movement, reflecting use of multiple senses but also listening issues; and finally, Ward's Naturalist category, which showed a lack of interest in reading, especially of a background contextual nature, but some reflective attitudes. The last cluster also indicated a holistic approach to environmental issues and an interest in the outdoors. The responses to puzzle solving, music and memory related tasks were most often negative.

The Ward's Intrapersonal sub-group showed that a grouping of questions covering drive or motivation, and meta-cognitive awareness, polarised toward being answered 'Yes' 78% of the time. The frequency of 'Yes' responses ranged from 60% to 92% of cases for this sub-group (see *App.6.32 – Intra*). Ward's Anti-verbal related to communication and handling information, especially verbal, where the responses were polarised to a 'No' response in 78% of cases.

Avoidance of verbal statements was expected and indeed, responses did not show normal distribution. There was strong positive cohesion amongst the Ward's Intrapersonal questions showing self-awareness. Within dyslexic students there appeared to be an individualistic or self-contained approach. However, there was no evidence of MI patterns, such as visual or kinaesthetic preferences.

MI Correlation

For multiple intelligences, there were the nine 'given' groupings, which could not be statistically supported by analysis of this data as the responses were dichotomous, and five alternative generated sub-totals from Hierarchical cluster analysis using the Ward linkage.

The relationship between the 'intelligences' was explored using the Pearson product-moment correlation coefficients. This showed positive correlation between all the variables, many of which were moderate in strength, $r = \pm .30$ to $.49$ (see *Table 6.11*).

Correlations										
N = 141		Naturalist	Musical	Logical	Existential	Interpersonal	Kinaesthetic	Verbal	Intrapersonal	Visual
Naturalist	Pearson Correlation Sig. (2-tailed)	1	.26(**) .002	.17(*) .039	.36(**) .000	.20(*) .015	.42(**) .000	.26(**) .002	.41(**) .000	.21(*) .012
Musical	Pearson Correlation Sig. (2-tailed)		1	.23(**) .006	.26(**) .002	.35(**) .000	.35(**) .000	.26(**) .003	.17(*) .039	.33(**) .000
Logical	Pearson Correlation Sig. (2-tailed)			1	.10 .224	.11 .182	.25(**) .003	.14 .094	.16 .053	.27(**) .001
Existential	Pearson Correlation Sig. (2-tailed)				1	.27 (**) .001	.32 (**) .000	.45 (**) .000	.46 (**) .000	.38(**) .000
Interpersonal	Pearson Correlation Sig. (2-tailed)					1	.28(**) .001	.28(**) .001	.32(**) .000	.22(**) .010
Kinaesthetic	Pearson Correlation Sig. (2-tailed)						1	.22(**) .008	.32(**) .000	.41(**) .000
Verbal	Pearson Correlation Sig. (2-tailed)							1	.32(**) .000	.18(*) .029
Intrapersonal	Pearson Correlation Sig. (2-tailed)								1	.14 .111
Visual	Pearson Correlation Sig. (2-tailed)									1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 6. 11 Multiple Intelligence ‘given’ totals, Pearson correlation

There were 14 pairings that showed a significant positive, moderate correlation. Existential Intelligence had the greatest number of these, only failing to show a significant correlation with Logical and only a low strength of relationship with both Musical and Interpersonal. The strongest correlation ($r = .46$, $r^2 = .21$) was between Intrapersonal and Existential, closely followed by Existential and Verbal ($r = .45$, $r^2 = .20$) and Kinaesthetic / Naturalist ($r = .42$, $r^2 = .18$). Intrapersonal also had five positive, significant moderate correlation pairings, although Logical failed to show any and Musical was small.

MI – data reduction

A factor analysis (PCA) was carried out with the nine given intelligence sub-totals (see *Appendix 3.4 i.2*, and *Table 6. 9*). Suitability for factor analysis and the rotation phase was

confirmed by a KMO = .79 (>.6), and a Bartlett test significance <.05 (see *App. 6.33*). For two components the Eigen values exceeded '1' (see *App. 6.34*), while the scree plot indicated that the second was a rather weaker component (see *App. 6.35*). Factor 1 explained 35.9% of the variance and factor 2, 12.65% (see *App. 6.34*). The component combination explained 48.55% of the variance.

The component correlation showed the strength of inter-correlation between factors to be .38. This confirmed the appropriateness of Oblimin (Oblique) rotation, as the variables were not independent. The Pattern matrix shows the variables' contribution to the underlying factor. With a sample size of 141, variables with loadings of .44 or above have relevancy to defining the underlying factor (see *Table 6. 12*). Component one (MICmp 1) had high loadings for Intrapersonal (.81), Existential (.76), and Verbal (.70) Intelligences. The high loadings in the second factor or component (MICmp 2) were Visual (.73), and Logical (.71).

Pattern Matrix(a)	Component	
	MICmp 1	MICmp 2
Intrapersonal	.81	-.13
Existential	.76	.03
Verbal	.70	-.06
Naturalist	.57	.16
Interpersonal	.46	.19
Visual	.03	.73
Logical	-.16	.71
Musical	.14	.62
Kinaesthetic	.28	.57

Extraction Method: Principal Component Analysis. Rotation Method: Oblimin with Kaiser Normalization.
a Rotation converged in 6 iterations.

Table 6. 12 MI totals Oblimin rotation Pattern matrix

Based on descriptions of the intelligences and the questions (see *Table 3. 5* and *Appendix 3.4 i.2* and *i.3*), the underlying factor, in component 1 (MICmp 1), was covered by statements related to a holistic view, meta-cognitive skills and the elements of self-knowledge that underpin effective higher order thinking and structure or organisation awareness that facilitates planning.

Component 2 (MICmp 2) was predominantly influenced by Visual and Logical Intelligence but included Musical and Kinaesthetic Intelligences. Visual and Logical questions in MI tap into mental visualisation skills as well as visual presentation. Logical and Musical questions relate to patterns, sequencing and organisation, but differ in that the logical questions relate to visual skills and the musical to auditory. This component

appeared to encompass modality, spatial skills including visualisation, and auditory awareness.

MI – Cluster analysis

When the given multiple intelligences were subjected to Two-step cluster analysis (Log-likelihood distance measure), two clusters of participants emerged (MI-G1, MI-G2). There were 66 people in Cluster 1 and 75 in Cluster 2 (see *Table 6. 13*).

Cluster Distribution		N	% of Combined
Cluster	MI-G1	66	46.8%
	MI-G2	75	53.2%
Combined		141	100.0%

Table 6. 13 MI sub-totals’ clusters, Two-step clusters analysis distribution

Cluster MI-G1 was a low scoring group and cluster MI-G2 were higher scoring (see *Table 6. 14*). The clusters both showed strength of self-awareness with the highest means for Intrapersonal Intelligences.

Centroids		Naturalist	Musical	Logical	Existential	Interpers onal	Kinaesthetic	Verbal
MI-G		Mean	Mean	Mean	Mean	Mean	Mean	Mean
Cluster	1	3.68	4.11	4.95	4.02	3.24	4.80	2.50
	2	6.35	5.85	5.64	6.96	5.47	7.47	4.12
Combined		5.10	5.04	5.32	5.58	4.43	6.22	3.36

		Intrapersonal	Visual	MI totals
MI-G		Mean	Mean	Mean
Cluster	1	6.38	4.15	37.83
	2	8.93	6.03	56.81
Combined		7.74	5.15	47.93

Table 6. 14 MI sub-totals’ clusters, Two-step clusters analysis means

Learning by doing was good for nearly every student (92%), as was *working alone* (84%) (see *App. 6.32*). MI-G1 participants showed distinctly lower Existentialist, Kinaesthetic and Naturalist means. Noise, TV and radio drew attention away from other tasks, quick mental arithmetic was a challenge, and step-by-step instructions helped. The lower scoring reflected a narrow range of interests and areas in which to succeed. Looking at the individual question responses for MI G2, they included all those for MI-G1, but also showed further tendencies such as: wider interests, including nature, arts and history; more inclination to read; greater spatial and pattern related skills (see *Section 6.3.1* for the impact of personality).

Gender differences in intelligences

Gender differences have been discussed in the literature both in terms of the number of people experiencing dyslexia and the severity of dyslexia experienced (see *Section 2.2.1 – Age at identification and gender*). Given the commonly held belief about better female literacy skills and the perceived dominance of men in maths and engineering, differences between ‘intelligences’ influenced by gender were thought likely. There were 21 males and 51 females in the WAIS sample (see *Figure 6. 4*) and the gender ratio for responses to the MI questionnaire was 50 male to 91 female.

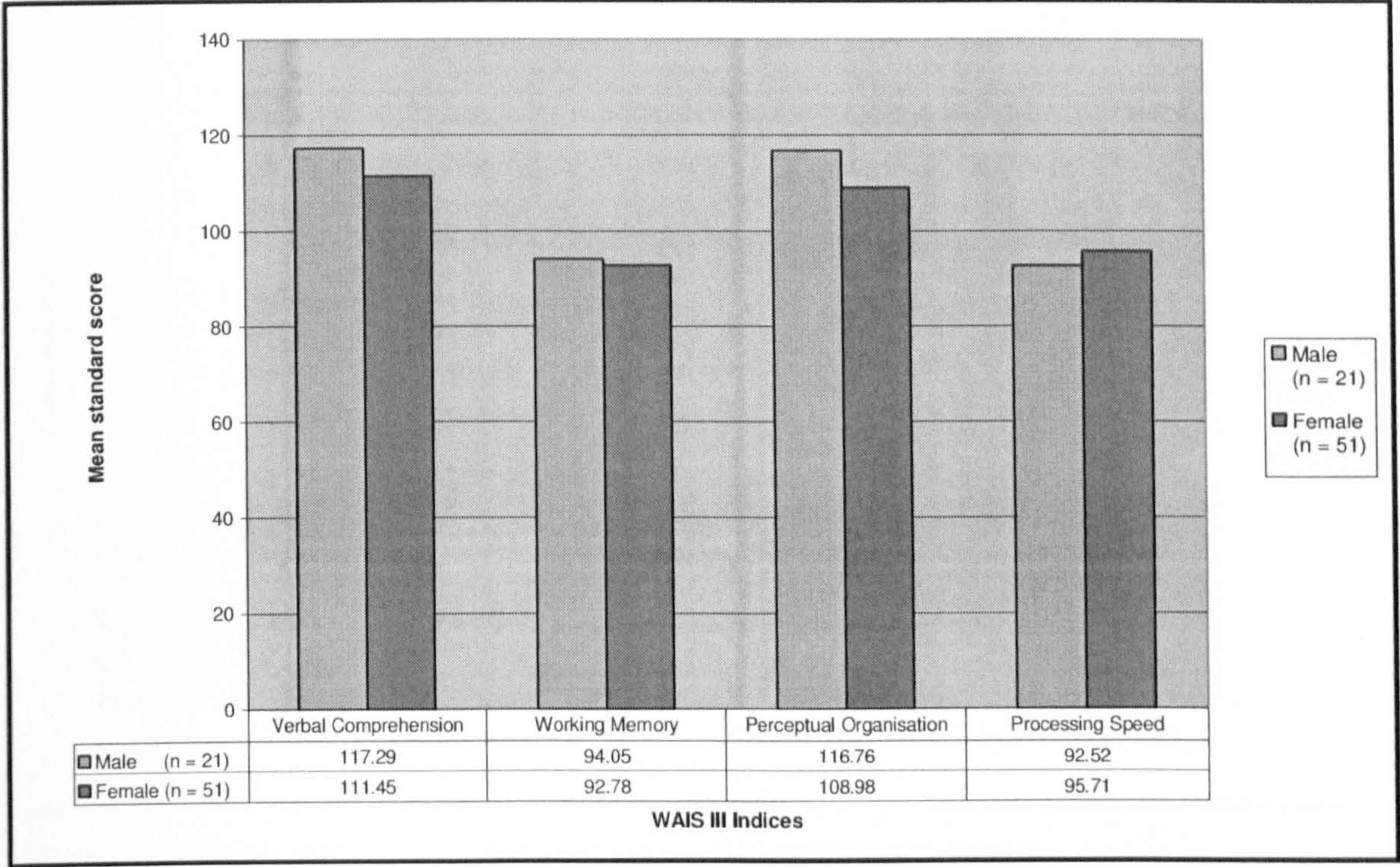


Figure 6. 4 WAIS Indices by gender [RI]

Overall the WAIS profiles found in this study were consistent with those in Grant (2005, 2004, 2001) (see *Figure 6. 1* above). An independent *t*-test on WAIS indices by gender showed a statistically significant difference for VCI, for males (M=117.29, SD=9.82) and females [M=111.75, SD=10.44; *t*(70)=2.19, *p*=.03] (see *App. 6.37*). POI showed a statistically significant difference, for males (M=116.76, SD=16.69) and females [M=108.98, SD=13.51; *t*(70)=2.06, *p*=.04] (see *App. 6.37*). The magnitude of difference in means for both (eta squared =.06) was moderate according to Cohen (1988) and cited in Field (2005).

Gender issues relating to multiple intelligences

The average score, for each intelligence, was considered by gender (see *Figure 6. 5*). Interpersonal and Verbal Intelligences mean scores for ‘Yes’ showed the greatest

difference between gender, being higher for females (see App. 6.38). Men scored a higher average of positive responses to Visual questions, as seen in the *t*-test result tables (see App. 6.39). When the mode (most frequent) response for each intelligence was considered by gender, the figures diverged most noticeably for Kinaesthetic in favour of males, and Verbal in favour of females. The low male mean score for the Verbal category questions was the result of the most common score being just one affirmative response (see. App. 6.39).

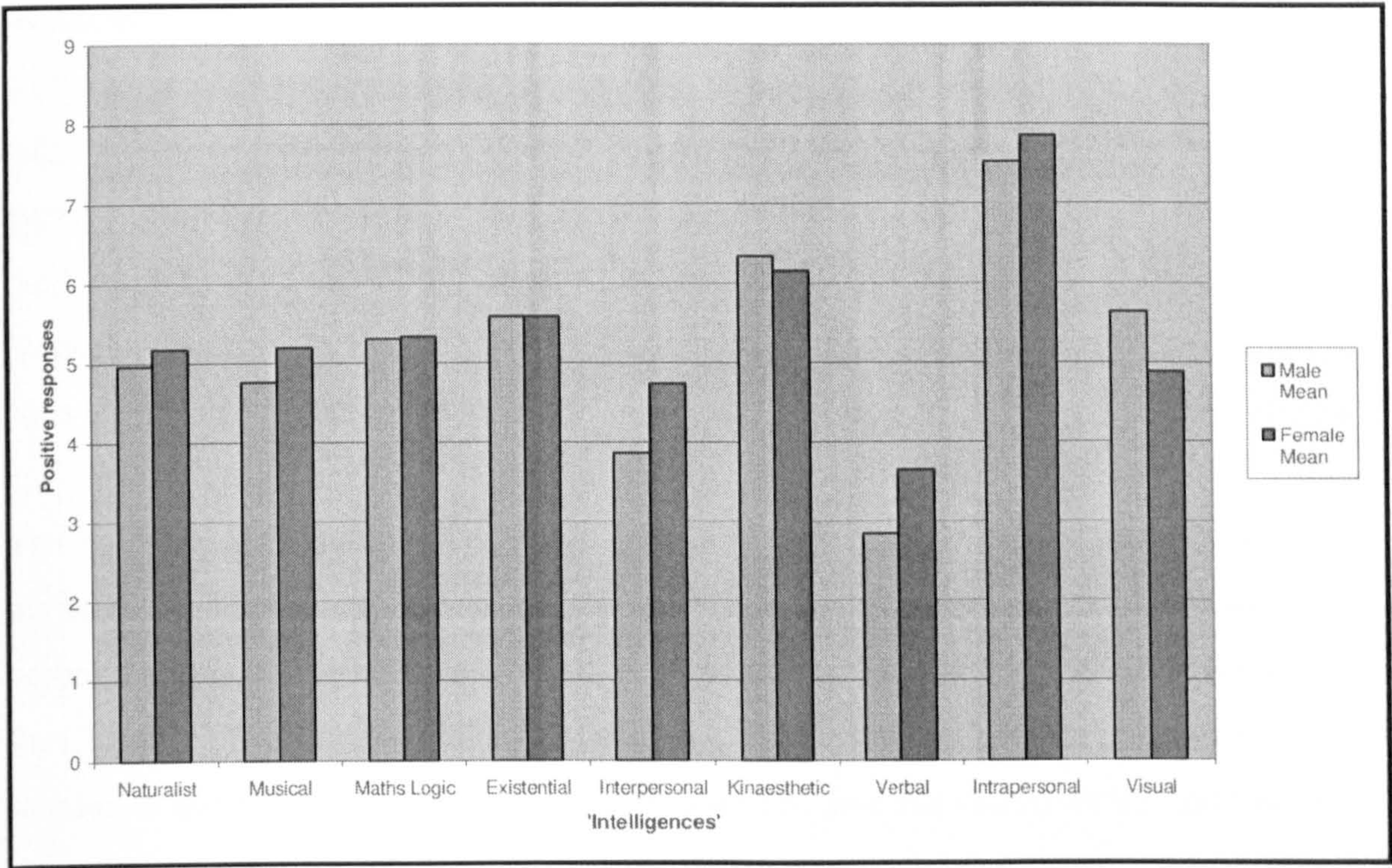


Figure 6. 5 Multiple Intelligence Mean scores of positive responses by gender

For Kinaesthetic, 91% of women responded ‘Yes’ to ‘*learn by doing*’, along with over 70% of men. This data gave no indication as to whether Kinaesthetic appeared to be a male strength due to experience, environmental conditioning, or genetic traits. For Verbal statements, the only significant ‘Yes’ response for women was to ‘*taking notes helps me remember and understand.*’ There was a 90% likelihood of men answering ‘No’ to ‘*I keep a journal*’, ‘*word puzzles like crosswords and word jumbles are fun*’, and admitting enjoyment of word games. Neither gender showed a trend for agreeing or disagreeing with ‘*I enjoy reading all kinds of material*’.

An independent *t*-test analysed the gender difference for the MI given intelligences and total score (see App. 6.39). For description of the intelligences and the domain they belong to, see Table 3.5. Interpersonal and Verbal totals showed statistically significant gender difference. Females agreed with more Verbal and Interpersonal questions. The difference

for the male mean for Visual was borderline significant, but the overall MI total did not show a gender difference. The female mean scores were significantly, higher for Verbal and Interpersonal questions but lower for Visual. An Independent *t*-test on the totals of the Multiple Intelligence Ward clusters showed no significant difference between genders (see *App. 6.40*).

Summary – intelligences observed and perceived

At a cognitive level IQ scores helped to identify specific difficulties in the areas of working memory and processing speed as part of a dyslexic profile. Using PCA, the four indices factored into two components reflecting P-IQ and VCI. Although PSI scores were average or low, there was a relationship with the POI score. Correlations did not support the Verbal IQ (VCI and WMI) construct in this sample. An independent *t*-test for WAIS (between genders) showed that there was statistically significant variance between genders. Men showed the higher mean for VCI.

The Two-step cluster analysis of WAIS grouped people by their score for each index, higher in one cluster and the lower in the other. Cluster 1 (Wcl 1) scored highly on non-verbal thinking and visual-spatial motor coordination (POI). The very low PSI mean score for Cluster 2 (Wcl 2) indicates that these students had issues with response speed both in relation to non-verbal thinking and coordination. The fact that cluster Wcl 2 had low WMI scores means that they might be easily distracted.

MI factor analysis looked at what the measure might actually address, while MI cluster analysis looked at how the participants group in the context of what is being measured. The MI test contents (see *Appendix 3.4 i.2*) meant that the sub-total labels were misleading and were not interchangeable with WAIS indices. MI Verbal Intelligence addressed use of the written form and was more closely related to VARK and the Read/write mode than VCI – knowledge and vocabulary. Statistics could not be used to determine nine clusters relating to the intelligences or three reflecting the domains proposed by McKenzie. The Anti-Verbal question cluster produced by using Ward's linkage for the Hierarchical cluster analysis was predominantly answered 'No'. In light of the high scores for VCI, this was of interest. The MI questions relating to writing and word puzzles grouped together, but reading questions were more dispersed and did not show a strong trend to 'No' responses. The scores of women for Interpersonal and Verbal questions were significantly higher than for men, and significantly lower on MI Visual statements.

Factor analysis of the given MI sub-totals showed that this measure addressed two underlying components – a holistic view with meta-cognitive skills and learning modality preferences with spatial awareness. Ward linkage used for Hierarchical cluster analysis yielded five clusters. The distinguishing question clusters were where Ward's Intra subgroup (drive or motivation, and meta-cognitive awareness) answered 'Yes', and Ward's Anti-verbal (communication and handling information especially verbal) answered 'No'. High scores in relation to Intrapersonal Intelligence and the Ward's Intrapersonal cluster questions suggests that self-knowledge and motivation are important qualities for a dyslexic in university. It was not possible to distinguish whether this was more closely linked to the dyslexia or to studying in HE.

6.2.2 Dyslexia Checklists and Literacy

The measure used in this research to consider personal perception of dyslexia was the BDA checklist (see *Section 3.3.2 – Main Survey, Appendix 3.4 d*). Further information on literacy skills came from general dyslexia report data and WRAT results from Leavers' details and Student Services data where participants' permission was held (Sellers, 2007).

BDA

The BDA Dyslexia Checklist (see *Appendix 3.4 d*) has been reviewed and modified for college students (Vinegrad, 1994). The version used was composed of 20 questions (see *Table 6. 15*) and provided a baseline of each participant's perception of their dyslexia. It was administered in a self-assessment situation with no intervention from the researcher. The data were then analysed for the 135 people who answered all 20 questions. Having considered the responses by case, the questions were then ranked in order of frequency of a 'Yes' response (see *Table 6. 15* or *App. 6.41* in question order). The 12 highest scoring statements were different to those in Vinegrad's research, which were: 17, 13, 7, 16, 18, 10, 19, 14, 20, 4, 1, and 11.

No.	Question	Total (yes) N=135	Frequency – yes
Q5	Do you find it difficult to remember the sense of what you have read?	119	0.88
Q4	Do you take longer than you should to read a page of a book?	114	0.84
Q12	Do you find it difficult to do sums in your head without using your fingers or paper?	107	0.79
Q11	When you have to say a long word, do you sometimes find it difficult to get all the sounds in the right order?	103	0.76
Q7	Is your spelling poor?	102	0.76
Q15	Do you find it difficult to say the months of the year backwards?	100	0.74
Q20	Did you find it hard to learn your multiplication tables at school?	100	0.74
Q3	Do you dislike reading aloud?	98	0.73
Q18	Do you find forms difficult and confusing?	91	0.67
Q6	Do you dislike reading long books?	82	0.61
Q9	Do you get confused if you have to speak in public?	79	0.59
Q1	Do you find difficulty telling left from right?	78	0.58
Q17	When writing cheques do you frequently find yourself making mistakes?	76	0.56
Q10	Do you find it difficult to take messages on the telephone and pass them on correctly?	70	0.52
Q2	Is map reading or finding your way to a strange place confusing?	66	0.49
Q16	Do you mix up dates and times and miss appointments?	61	0.45
Q19	Do you mix up bus numbers like 95 and 59?	59	0.44
Q13	When using the telephone, do you tend to get the numbers mixed up when you dial?	56	0.41
Q8	Is your writing difficult to read?	53	0.39
Q14	Do you find it difficult to say the months of the year forwards in a fluent manner?	19	0.14

Table 6. 15 BDA checklist questions, sorted on total ‘yes’ responses

In Vinegrad (1994) only 10% of his sample had eight or more ‘Yes’ responses putting them in an at-risk of dyslexia group. The mean score of positive responses was 12.7 for Vinegrad’s dyslexic sample, and 4.4 for the non-dyslexic group. The data from the current study found that the mean number of ‘Yes’ responses per dyslexic person was 12.1. It was noted that dyslexics hesitated in responding and wished to consider whether having a strategy that worked was the same as not having a problem (Vinegrad, 1994). A number of respondents in this study showed indecision on how to answer and a desire to select the middle ground was shown by ticking the line between yes and no. This was generally taken to indicate that there was some problem, as other students seemed to be in no doubt of their responses. Two students gave their answers by dictation, which always resulted in reference to strategies or comments like ‘I used to have trouble’. Where strategies had become automatic there might have been no perception of current difficult with a task.

Some of the differences might have occurred because the current study was based purely on an HE sample and not a population cross section. Another consideration was that there were twice as many females as males in the sample.

The response frequency was reviewed because feedback had suggested that students had not related to some of the tasks mentioned in the questions. It was not surprising to find that problems with writing a cheque (Q17) and mixing up digits when you dial (Q13) were less frequently reported (originally ranked one and two) due to changes in modern life. These questions had dropped out of the top 12, no longer serving as the best discriminators. Others that seemed of less concern to HE students, or were adequately compensated for, were mixing up dates and times of appointments (Q16), confusing bus numbers (Q19) and saying the months of the year (forward) in a fluent manner (Q14). Reading and memory related questions were the prime areas of difficulty awareness.

BDA Chi-Squared

A Chi-squared test for independence was used to explore relationships between the BDA categorical variables (Yes, No). Field (2005, pp. 689-95) indicates Phi-coefficient can be used to describe the strength of association between two categorical variables, for two-by-two tables. Taking the Phi value, the three strongest associations were seen between questions relating to difficult with filling in forms and dialling phone numbers ($\Phi = .46$), doing mental arithmetic and learning multiplication tables ($\Phi = .43$) and then slow reading and disliking long books ($\Phi = .41$) (see *App. 6.42*). Further highly significant combinations (positive correlation $\Phi = .35$) included three where each involved difficulty dialling phone numbers was associated with either writing cheques, mixing up bus numbers or mental arithmetic (see *App. 6.43* for the all moderate strength associations).

Derived sub-totals for BDA, by Cluster analysis – Ward linkage

As the data for the checklist was dichotomous [present = 1 (Yes), absent = 0 (No)], Hierarchical Cluster analysis with Ward linkage was used to investigate grouping the questions to give tallied sub-totals for further analysis.

Ward-linkage, using Squared Euclidian distance, produced two clusters within a rescaled distance of 10. Questions 12 and 20 showed a high degree of 'alikehood', seen in the short distance before they were combined (see *Figure 6. 6*); these questions related to mental arithmetic and learning multiplication tables. The reading related questions also grouped together. By breaking the weakest amalgamation, the questions were split 11:9 between two clusters.

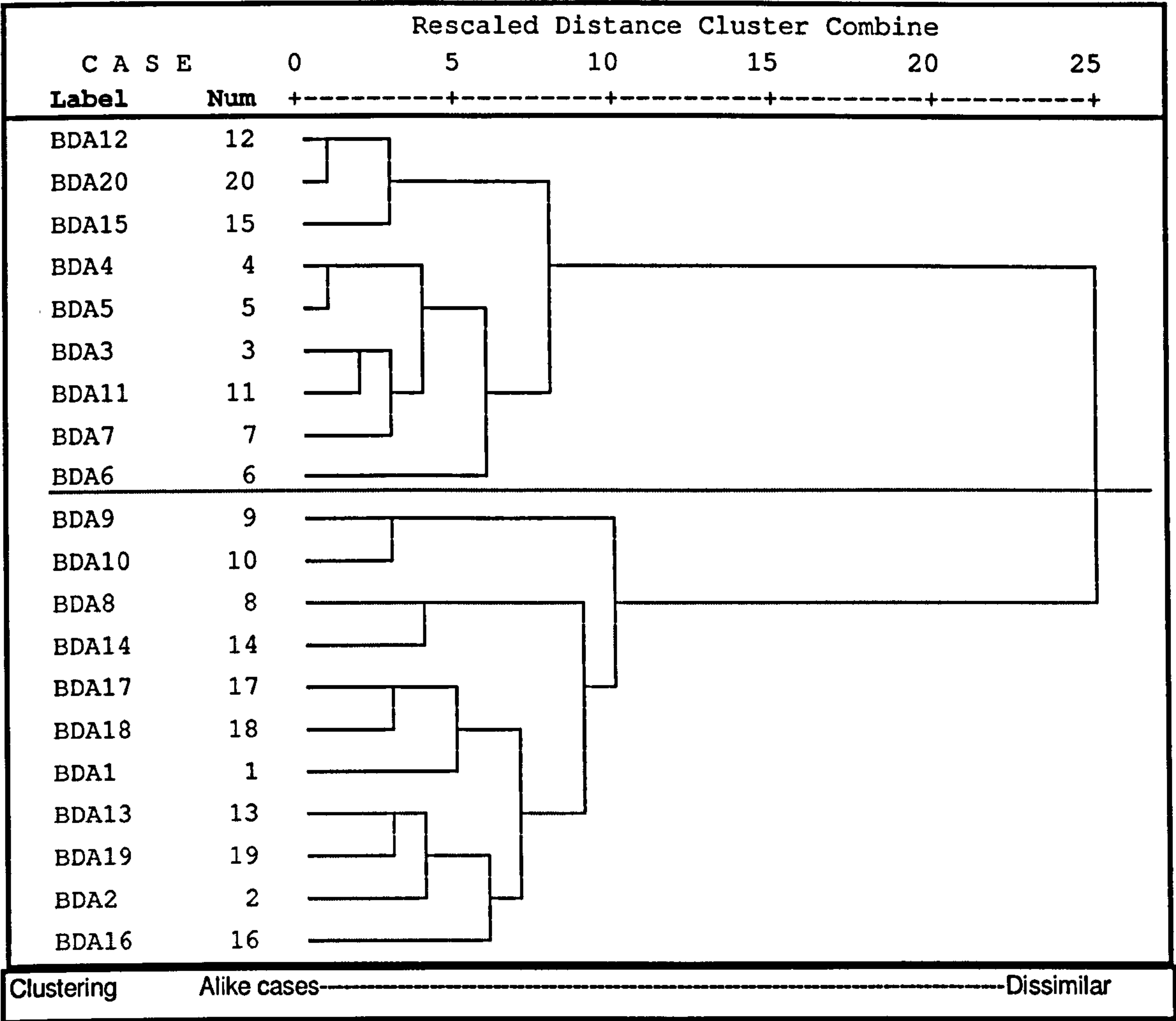


Figure 6. 6 BDA questions Dendrogram using Ward Method

Questions 9 and 10, which related to speaking in public and taking messages, grouped together reasonably; this pairing was an outlier, being the last pairing to join a cluster. Interestingly, problems relating to ‘map reading or finding your way in a strange place’, were not associate with difficulties in ‘telling left from right’ but with spatial sequencing used for remembering bus numbers or coordinating dialling phone numbers.

The BDA Ward clusters could be seen as related to memory capacity/processing text, reading (Cluster 1), and processing speech, spatial coordination (Cluster 2). The new cluster positive response sub-totals were divided by the number of questions in each, to provide a percentage score, keeping the scale the same (range 0-1). Descriptive statistics and correlations were applied to the derived sub-totals (see Appendix 6.2.4 – BDA Ward clusters). This confirmed the high-percentage, low-percentage split.

Dyslexia by gender

The sample contained nearly twice as many females as males. The rank-order, of the top 12 response frequencies, varied by one or two positions between the genders (see Appendix 6.2.4 - BDA gender). In Figure 6. 7 the questions were ordered by percentage of ‘Yes’ response to a question (see Table 6. 15 for questions). A Chi-squared test for independence was used to examine BDA questions by gender (see Appendix 6.2.4 – BDA gender crosstab). Only Q8 showed a significant relationship between gender and response (see App. 6.47-App.6.49). The question asked whether ‘*your writing is difficult to read*’ to which 27.6% of dyslexic women agreed, and 60.4% of men (see App. 6.47-App.6.49). Men were more conscious of their *hand-writing* (Q8), $\chi^2 (1) = 13.98, p<.001, \text{Phi} = .32, p<.001$. This is a moderate association and highly significant. This question was not particularly important in identifying dyslexia. The difference in response to a question about ‘*telling left from right*’ (Q1) was almost statistically significant (.057). More females reported a difficulty (64.4%) than men (45.8%) (see App. 6.50-App. 6.52) with $\chi^2 (1) = 4.36, p<.05, \text{Phi} = -.18, p<.05$ showing a negative association. These can be thought of as perceptual / spatial coordination issues, which manifest themselves differently according to gender.

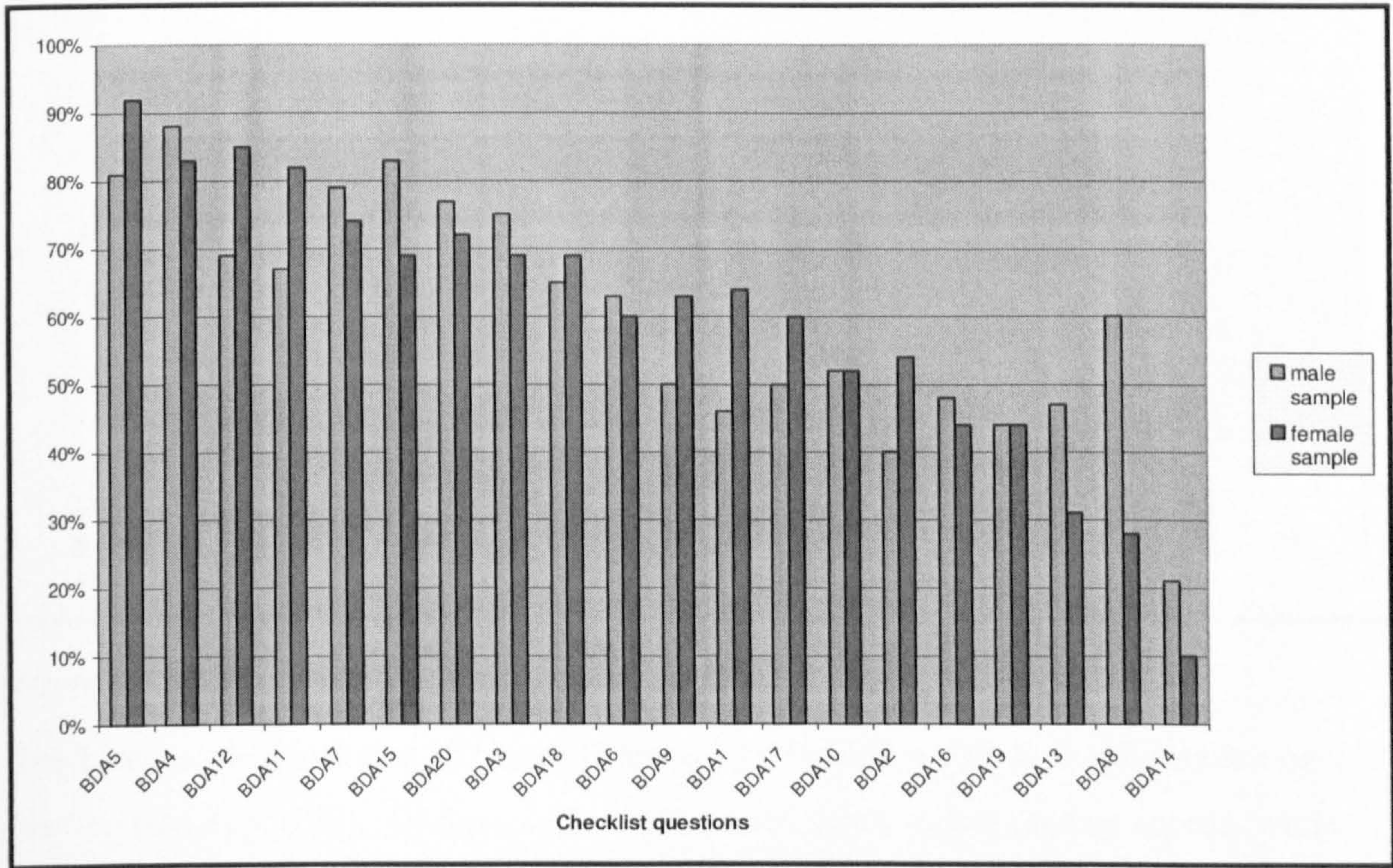


Figure 6. 7 BDA checklist responses in percentages order, for each gender sample

Literacy

Literacy skills were considered by reviewing a wider range of data available from Student Services records, rather than just the measures used in this research. The areas of difficulty mentioned most frequently in the dyslexia reports summaries were related to spelling, reading and memory / recall. The summaries focused on key points in the reports and quantitative results. In the cases with some report and gender data (N= 1162, Male = 604, Female = 558), references were made to problems with spelling 200 times for men compared to 138 for women. Women’s reports included more references to reading and memory difficulties than those of men. Spelling, closely followed by reading, were highlighted as the most frequently reported areas of difficulty (see *Figure 6. 8*, and *App. 6.53* including WAIS), with 596 cases reporting at least one of these topics. A further 185 cases had summaries that focused on memory and recall rather than spelling and reading, while an additional 287 report summaries indicated just the IQ test type and the assessor.

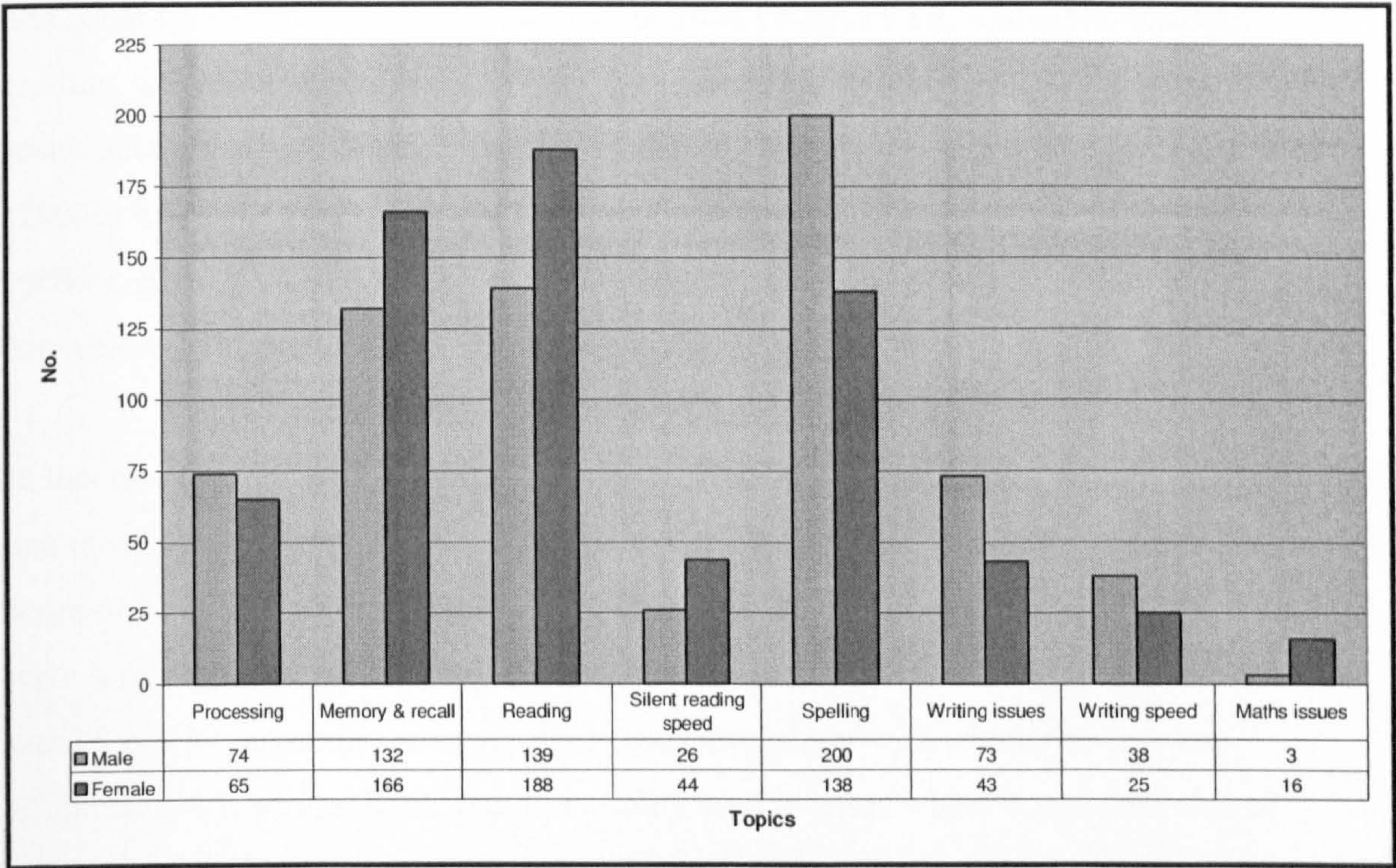


Figure 6. 8 Literacy topics frequency in reports, by gender

The Leavers’ data included 327 cases (Male = 139, Female = 188) with information on reading (see *App. 6.54*). Of these cases, 34% related solely to low reading speeds, while only 16% referred to reading comprehension problems, 4% related to accuracy, and 4% had at least two areas of reading difficulties. For the remainder, the reports of poor reading were non-specific.

The overall average silent reading speed reported was 119 wpm (range 75-180 wpm) (see *App. 6.55*). The expected range for undergraduates is between 200-250 wpm. Reading and writing speed appeared in 6% of reports. A free-writing speed of 23-25wpm would be expected for undergraduates, whereas the average for the students who had notes in their reports was 13 wpm and showed little difference between genders (see *App. 6.56*).

The information covered in the reports was logged under eight headings (see *Figure 6. 8* above). In most cases the topics were referenced when a weakness was shown. The exception was processing speed. PSI from WAIS-III allowed this to be considered in more depth (N= 138); almost 4% were references to results over the 90th percentile or 119 standard score (see *App. 6.16*).

Many of the dyslexia reports (46) included some WAIS indices (19 with all WAIS indices) and some for the Wide Range Achievement Tests (WRAT), i.e. scores for spelling, reading, and arithmetic. Use of WRAT was mentioned in a further 150 reports where no result details were available, reflecting a tendency to only report extreme scores. Grant (2004b) found the average scores for dyslexic students undertaking the reading and spelling elements of the WRAT were, for word reading and accuracy, 33rd percentile, and for spelling, 26th percentile.

In this research, 90 students' reports gave the WRAT percentile score for one of the tests, and these were converted to the standard score. The average Reading score was standard score of 91 or 27th percentile (N=28), Spelling was 87 or 19th percentile (N=81). There were only eight cases where the maths test was reported. The standard score mean for this was 88 or 21st percentile; however given the infrequency with which this test was administered, it was probable that it was only used in cases where it was desirable to quantify a pre-identified maths-based difficulty.

Chi squared was used to look at the relationship between some BDA questions (see above *Table 6. 15* or *App. 6.41* – BDA questions). The Phi values show the associations were small (see *Table 6. 16* and *Table 6. 17*) for the combinations including spelling problems, but moderate in relation to reading (see *Table 6. 18*). There was a very small association between *poor spelling* (Q7) and *disliking reading aloud* (Q3) at a relatively low level of significance (.05) (see *Table 6. 17* and *App. 6.57* and *App. 6.58*). The effect size,

calculated from the Crosstab (see App. 6.59), showed that a student was 2.5 times more likely to have bad spelling when a dislike of reading aloud was expressed.

Symmetric Measures				
		Value	Approx. Sig.	Exact Sig.
Nominal by Nominal	Phi	.191	.026	.042
	Cramer's V	.191	.026	.042
	Contingency Coefficient	.188	.026	.042
N of Valid Cases		135		
a. Not assuming the null hypothesis.				
b. Using the asymptotic standard error assuming the null hypothesis.				

Table 6. 16 Correlation between spelling problems and dislike of reading aloud [BDA]

Handwriting that was *difficult to read* (Q8) and *poor spelling* showed a small association and a greater significance (see Table 6. 17 and App. 6.60-App. 6.62). In this sample the effect size showed that a student was three times as likely to have difficulties with spelling if the handwriting was difficult to read.

Symmetric Measures				
		Value	Approx. Sig.	Exact Sig.
Nominal by Nominal	Phi	.210	.015	.023
	Cramer's V	.210	.015	.023
	Contingency Coefficient	.206	.015	.023
N of Valid Cases		135		
a. Not assuming the null hypothesis.				
b. Using the asymptotic standard error assuming the null hypothesis.				

Table 6. 17 Correlation between spelling problems and poor handwriting [BDA]

However, there was a moderate, positive effect size between BDA Q4 and Q6 which was significant (see Table 6. 18, App. 6.63-App. 6.65), which was not particularly surprising as it indicated that taking *a long time to read a page* (Q4) was related to *not liking to read long books* (Q6). The greatest effect size showed that a student is 13.5 times more likely to dislike reading long books when reading is a slow process (see App. 6.65).

Symmetric Measures				
		Value	Approx. Sig.	Exact Sig.
Nominal by Nominal	Phi	.408	.000	.000
	Cramer's V	.408	.000	.000
	Contingency Coefficient	.378	.000	.000
N of Valid Cases		135		

a. Not assuming the null hypothesis.
b. Using the asymptotic standard error assuming the null hypothesis.

Table 6. 18 Correlation between reading slowly and disliking long books [BDA]

The BDA results came from checklists, which were self-assessed, while WRAT results came from an independently administered test, and the sample overlap was small. There was no correlation between the WRAT spelling results and responses to BDA Q7 (*poor spelling*) or Q8 (*poor hand writing*) (see App. 6.66) (N=16). Likewise there was no relationship between the WRAT reading result which involves reading individual words aloud and BDA reading questions (Q3 and Q6) (N=5) (see App. 6.41 BDA questions: 3-6).

Literacy by gender

WRAT literacy data, although limited, was also considered by gender (see Figure 6. 9). The fact that extreme or unexpected results were more likely to be reported should be kept in mind when reviewing this information. The spelling sample (N=81) had a female mean of 86 (18th percentile) and male of 88 (21st percentile) (see App. 6.67 and App. 6.68 for details including Reading and Maths).

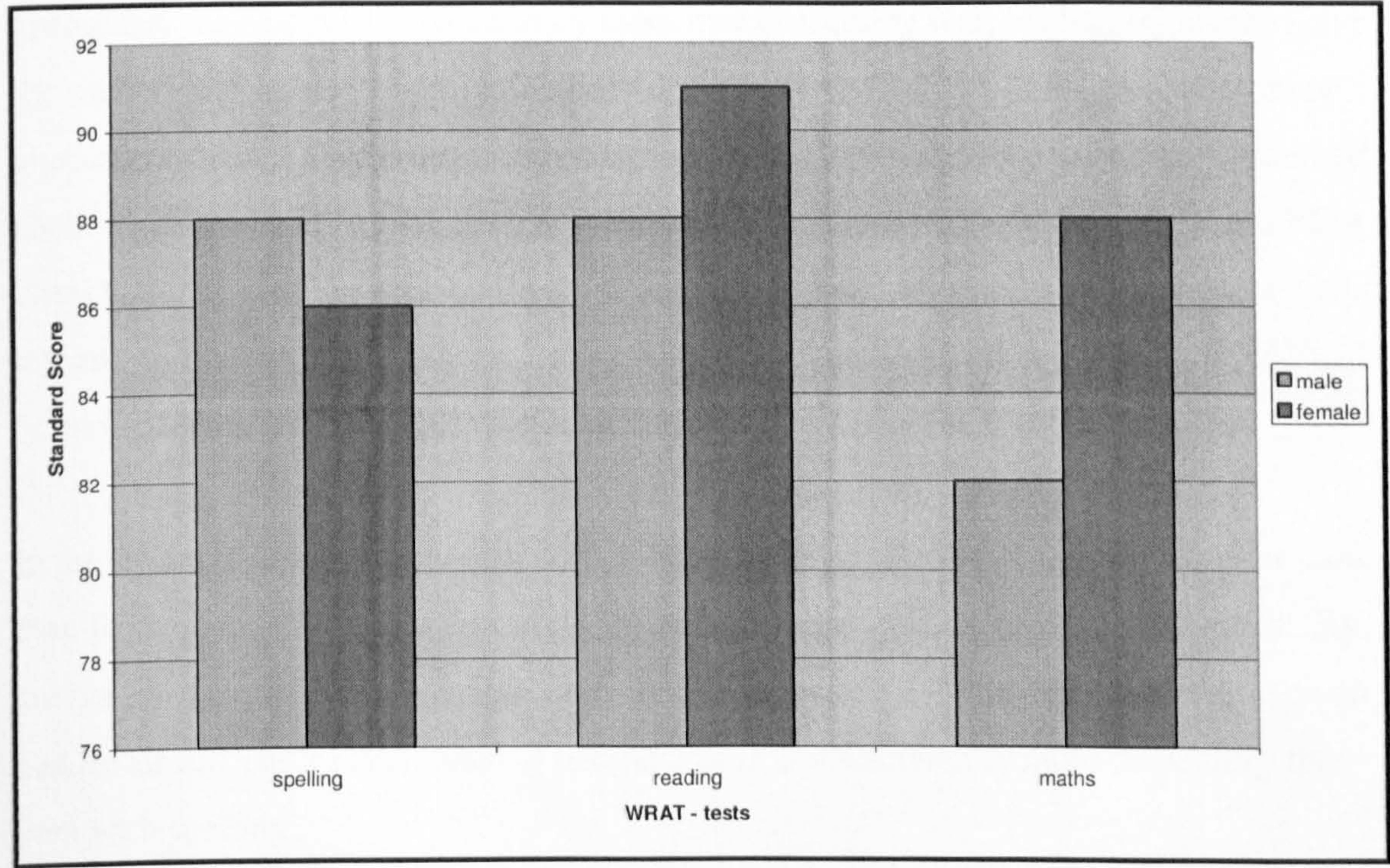


Figure 6. 9 WRAT mean by gender

Although specific BDA questions could be grouped as reading, writing or maths, there was no relationship with the WRAT data. An independent *t*-test showed that the only significant gender difference was between questions related to writing skills (Q7 and Q8). Factor analysis did not produce suitable values.

WRAT maths data was excluded due to lack of cases, but the Pearson correlation coefficient was used to measure the linear association between the remaining two variables. The sample (N=20) of WRAT Spelling and Reading scores showed no significant correlation (see *App. 6.69*).

A major limitation on the sample size was the varied contents of the original Educational Psychologists' reports, which omitted some data and did not use a consistent range of literacy tests. This limitation of sample size was compounded further by the number of people who had given permission to access the report data. As a result, permission existed for just two cases that included both WAIS-III and WRAT. It was therefore not possible to consider the strength or direction of relationship between the WRAT and WAIS-III indices. There were insufficient cases with WRAT scores to use Principle Component Analysis.

Summary of students' perception of their own dyslexic difficulties

There were common perceptions of difficulties, the highest ratings being given to reading, working memory capacity and spelling issues. The BDA cluster analysis produced two groupings, the first related to memory capacity / processing text, reading (Cluster 1) and the second to processing speech, spatial / coordination (Cluster 2). Women were more concerned about their reading comprehension than speed, and not particularly concerned about their handwriting (the latter was the only significant gender difference in the BDA checklist). Women focused on the co-ordination / spatial awareness issue of distinguishing left and right rather than on their handwriting. For men, the auditory or memory difficulty of taking telephone messages remained important.

In the dyslexia reports, more observations of problems with spelling were made for men than for women. Women's reports included more references to reading difficulties. By contrast, the limited data from the objectively assessed WRAT tests showed that women had fewer difficulties with reading (single word), but fractionally more difficulties than men with spelling.

6.2.3 Learning Mode Preferences

Learning Mode preferences cover just one aspect of a Learning style, but one open to self-modification. In this research the focus is the mode preference for giving and receiving of information.

VARK

VARK includes 13 individual questions (see *Appendix 3.4 h.1*) offering multiple mode responses. Nearly half of the participants in this study found one answer to each question was adequate. The scoring spreadsheet, provided by Fleming, was used to extract details about the nature and strength of modal preferences from the 141 participants' responses (see *Appendix 6.2.6*). In this study the responses to Question 12 strongly favoured use of the Visual mode, as did Question 10, but only Question 3 showed responses strongly favouring the Auditory mode (see *Appendix 3.4 h* for details). This sample did not show Questions 2 and 11 as predominantly Read/Write, unlike Fleming's findings (2005).

Due to the categorical nature of the responses, and the possibility of multiple responses, mode rather than mean scores were the most appropriate frequency statistic for these variables. The VARK sample from this study showed a pattern of responses, distinct both from others of the same sex and other university students in Fleming's data (2005). Fleming showed students' mode preference took on a 'staircase' format increasing towards Kinaesthetic. The responses of the dyslexic students in the current study (see *Figure 6.10*), showed a 'valley' shape.

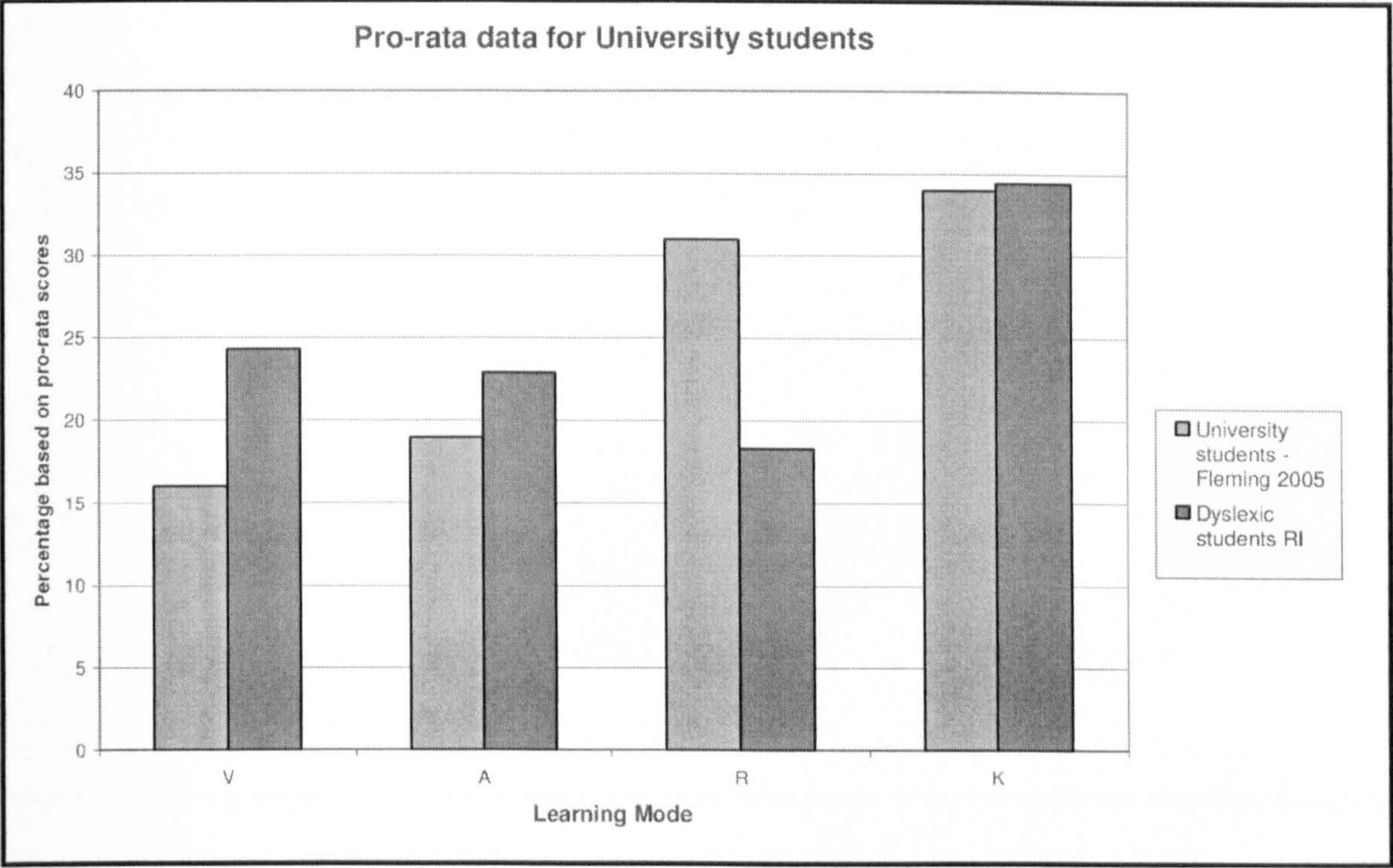


Figure 6. 10 VARK pro-rata modality scores for this study against HE students (Fleming, 2005)

Fleming (2005) showed that most students preferred the Kinaesthetic to Read/write modality. Within the single modes, the preferred mode was Kinaesthetic for both this research and Fleming’s studies. In these findings, dyslexic students appeared to be compensating for their difficulties associated with the Read/write modality by using Visual and Auditory modes instead. These findings placed Auditory second rather than Read/write (Fleming, 2005).

Overall the preference was for any form of multiple modal learning (56%) (see *Figure 6. 11* and *App. 6.71 – VA-VARK*) and was in line with the designers’ findings in 2005, rather lower percentage for the four mode VARK combination, than seen for HE students as a whole.

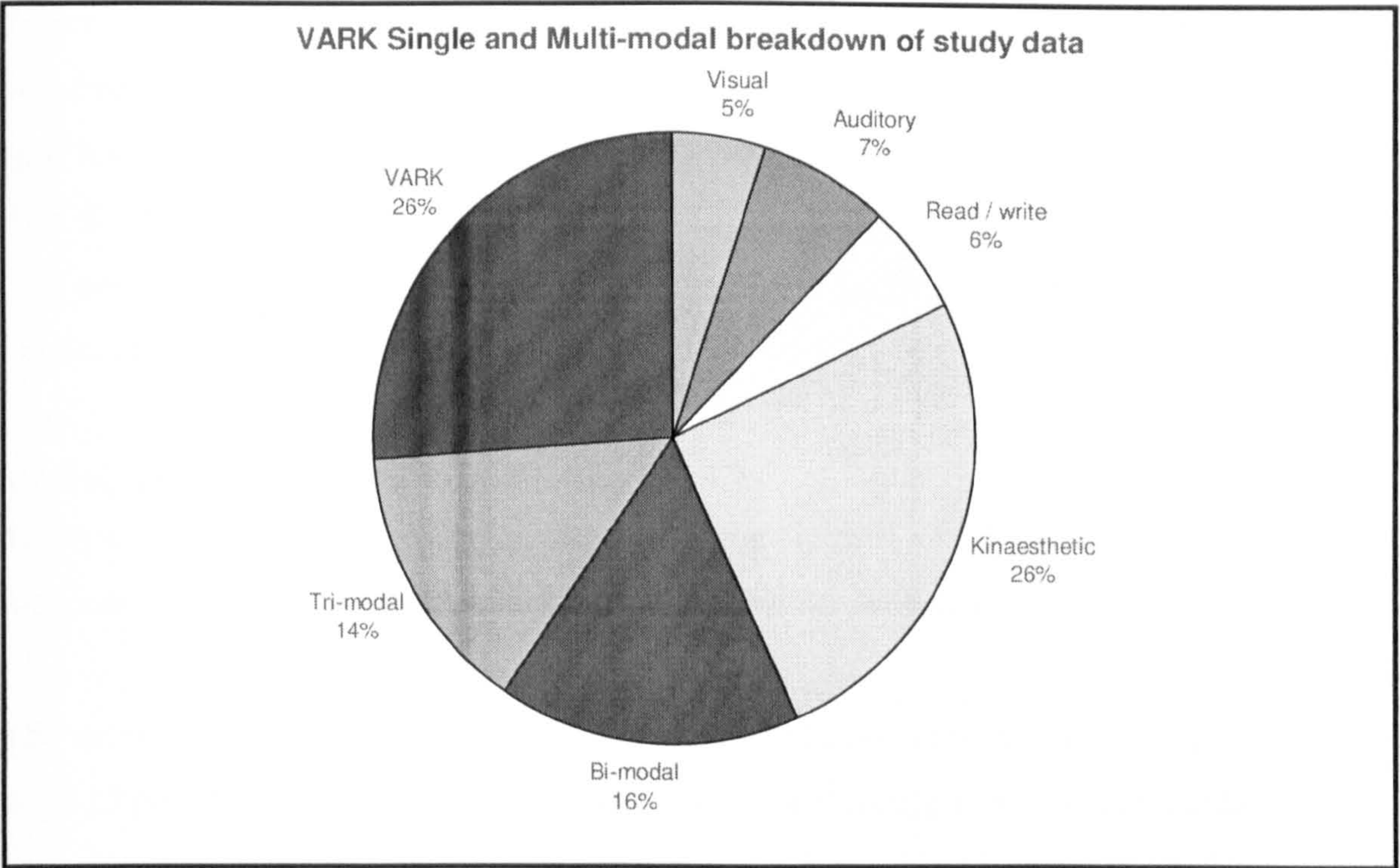


Figure 6. 11 Pie chart of VARK mode preferences of dyslexic students in this study

A recurring theme in papers and articles relating to VARK is that zero is an unusual score for any mode (void score) and worthy of note. This study found almost three times the number of ‘void’ mode scores for Read/write compared to Fleming’s data (see *Figure 6. 12*). The students avoided reading or writing as a means of giving or receiving information.

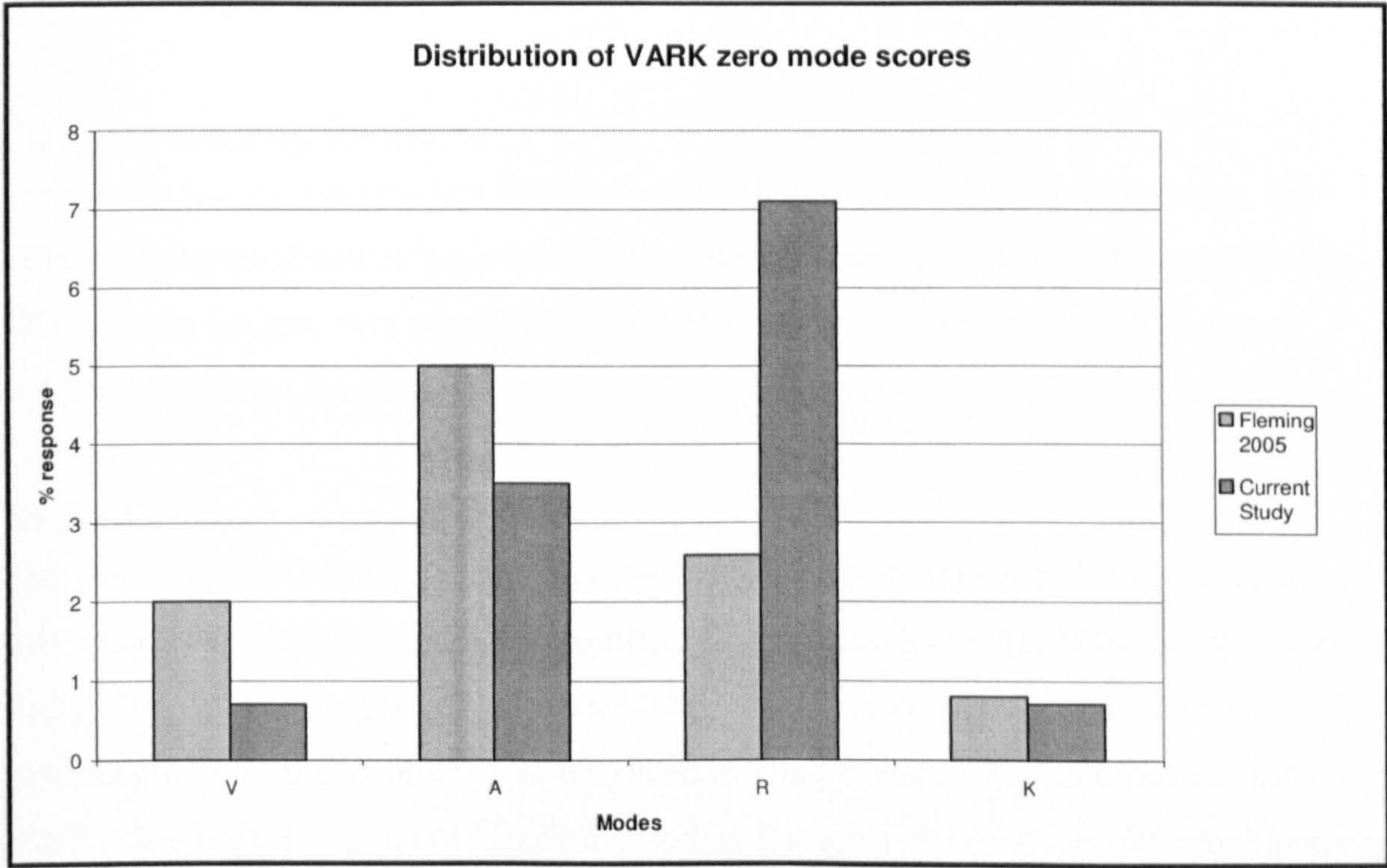


Figure 6. 12 VARK – distribution of zero scores by mode

Where the score indicated a single-mode preference ($N = 61$), a rating of strength was calculated using the designers' spreadsheet formula. Strength of preference was evenly split between being the classifications 'Mild', 'Strong' or 'Very strong' (see *App. 6.72* and *App. 6.73*). Although women used Read / write less to communicate than men (see *App. 6.74* and *App. 6.75*), an independent *t*-test showed no significant difference between genders for any of the learning modes.

VARK totals – data clusters and reduction

There were no significant correlations between the various VARK responses. An independent *t*-test showed no gender differences for the four modes.

The nature of the data meant that only Hierarchical cluster analysis could be used. There were 15 possible combinations for single modes, disregarding strength. No distinct groupings between cases or variables were found with the Ward linkage method for count data.

Summary – Learning Modes

These findings did not show a significant gender difference, unlike Fleming's data. The students also showed a pattern of responses distinctive from Fleming's data for university students. The questionnaire was only able to give a snapshot, but showed low preferences for the Reading/write mode.

6.2.4 Personality Profile

Personality factors were thought likely to influence the use of support, for instance, the effect of failure and how it was explained, and the acceptance of the possibility of change. Of particular interest were aspects such as distractibility and persistence, which were potentially relevant for learning.

NEO-FFI (Big-5) – individual questions

The individual NEO-FFI personality questions are set out in *Appendix 3.4 j*. The data for this sample ($N=96$, M:33, F:63) gave similar reliability results to that of the designers (see *App. 6.79*). Maximising the Cronbach's Alpha value (greater than .7) can be used to indicate questions that contribute least to what is being measured (see *Appendix 6.2.7 – Big-5 reliability*). In 33 out of 60 cases 'Strongly Disagree' (SD) was the favoured answer.

Big-5 questions – factor analysis

A factor analysis was undertaken to see whether the responses of the population being studied showed a similar profile to a normal population. Principal component analysis (PCA) was used, with Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett’s test of Sphericity (see *Appendix 3.4 j*, and *App. 6.80 - 6.83* for details of PCA). The data from the current population fell into five factors relating to the original grouping of the questions (see *App. 6.83* and *App. 6.84*).

A table was created to examine responses to questions where a high percentage were polarised in one direction, ignoring questions that fell in the neutral range (see *Table 6. 19*). For the *Table 6. 19* the five-point scale was simplified to ‘Agree’, ‘Neutral’ and ‘Disagree’.

Domain	Facet	Question	type resp.	% type response
A	Altruism	I generally try to be thoughtful and considerate.	Agree	97
A	Altruism	I try to be courteous to everyone I meet.	Agree	90
C	Achievement	I work hard to accomplish my goals.	Agree	88
C	Dutifulness	I try to perform all the tasks assigned to me conscientiously.	Agree	83
O	Ideas	I have a lot of intellectual curiosity.	Agree	82
O	Actions	Once I find the right way to do something, I stick to it.	Agree	80
E	Warmth	I really enjoy talking to people.	Agree	79
C	Dutifulness	When I make a commitment, I can always be counted on to follow through.	Agree	78
C	Self-discipline	I am a productive person who always gets the job done.	Agree	76
O	Ideas	I believe letting students hear controversial speakers can only confuse and mislead them.	Disagree	75
C	Achievement	I strive for excellence in everything I do.	Agree	75
Also of interest				
C	Self-discipline	<i>I waste a lot of time before settling down to work.</i>	Agree	59

N = Neuroticism, E = Extraversion, O = Openness, A = Agreeableness, C= Conscientiousness
Questions hi-lighted were scored in reverse, as agreeing with the statement was deemed undesirable.

Table 6. 19 Big-5 response trends and percentages

The most common responses of the dyslexic sample included strong agreement (SA) with the statement ‘*I work hard to accomplish my goals*’, which was tempered by an awareness of a tendency to prevaricate. Other responses indicated conscientiousness and reliability in relation to completing tasks, but a tendency to stick with a method that works rather than

trying to improve on it. There was a propensity to strive for excellence but also to get work done.

Big-5 Domain totals

The five personality domain totals were converted to *T*-score data, which was used for analysis, as it brought both genders onto one scale with a mean of 50 (see *App. 6.85*). From the sample of 96, 14 cases (15%) were found to be off the top of the provided scale, showing either Neuroticism or Extraversion. These cases were predominantly female. Nearly one third of the women participants were outside the expected range for one of their five results, whilst for men it was one in six. Just two participants were off the provided scale for more than one of the five factors. Where Agreeableness was off the bottom of the scale all six cases were female, while in total five cases, both genders, were off the bottom of the scale for Conscientiousness. One male was off the top of the Extraversion scale but had a very low score for Conscientiousness. Neuroticism was the only domain to show any positive skew towards the lower value responses. Extraversion was negatively skewed to the higher scores and kurtosis showed centralised clustering of responses (see *Table 6. 20* or *App. 6.86–App. 6.91*). The most frequent Extraversion score was actually the only mode in the high result range. Women were more likely to score highly on Neuroticism according to the test designers, as was the case here. The woman with two extreme scores had high results for Neuroticism and low for Agreeableness.

Means for the five factors, with gender differences, were calculated as part of an Independent *t*-test. The results showed average score for Openness and Extraversion when compared with scores for the general population, but lower than average scores for Agreeableness and Conscientiousness and higher for Neuroticism (see *Table 6. 20*).

Factors	Gender	N	Mini mum	Maxi mum	Mean	Std. Deviation	Std. Error Mean
T score Neuroticism		96	27	85	58.09	13.15	
	male	33			54.55	10.79	1.88
	female	63			59.95	13.95	1.76
T score Extraversion		96	19	79	52.45	10.94	
	male	33			52.64	10.96	1.91
	female	63			52.35	11.02	1.39
T score Openness		96	31	74	53.45	10.47	
	male	33			52.42	9.92	1.73
	female	63			53.98	10.79	1.36
T score Agreeableness		96	18	69	44.63	11.91	
	male	33			46.79	12.49	2.17
	female	63			43.49	11.54	1.45
T score Conscientiousness		96	15	67	43.17	11.22	
	male	33			44.70	12.12	2.11
	female	63			42.37	10.73	1.35

Table 6. 20 Big-5 T-score means, with gender split

Only Neuroticism offered a gender difference that bordered on significant (see *Table 6. 21* and *App. 6.92* for the full table).

Independent Samples Test		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
T score Neuroticism	Equal variances assumed	4.05	0.047	-1.94	94	0.055	-5.41	2.79
	Equal variances not assumed			-2.10	80.65	0.039	-5.41	2.57

Table 6. 21 Big-5 Neuroticism independent t-tests

Predominantly women were scoring very highly on Neuroticism (N). The design details indicated that a higher N score was to be expected for women (Costa and McCrae, 1992 p. 55). The design indicated that women were also expected to score more highly on Agreeableness, especially in Altruism facet questions (five out of 12 A questions), but this was not found to be the case here.

The table below (see *Table 6. 22*) is based on a review of the frequency statistics including mean and using a summary of the personality descriptions provided by Costa and McCrae (1992). It gives an impression of a dyslexic student.

Neuroticism – high / average	Extraversions – average	Openness – average	Agreeableness – average / low	Conscientiousness – low
Quite sensitive and aware of emotions, generally calm and able to deal with stress but can feel guilt or anger.	Moderate in activity and enthusiasm, enjoying the company of others but also valuing privacy.	Practical but willing to consider new ways of doing things, seeking a balance between the old and the new.	Mostly trusting but with both a sceptical and competitive edge. Can be stubborn or even hard-headed, might express anger directly.	Easygoing, not very well-organized, and sometimes careless, preferring not to make plans.

Table 6. 22 Big-5 overall dyslexic profile

Big-5 – Domain correlation

Correlation of the Big-5 personality t-score totals showed three significant correlations (see *Table 6. 24*) for linear relationships between the sub-total variables. Costa and McCrae (1992) suggest that the Neuroticism and Extraversion combination represented an individual’s basic emotional style. In this study the correlation between Neuroticism and Extraversion ($r = -.43$, $r^2 = .18$, $N = 96$, $p < .0005$) was negative; i.e. high Neuroticism was associated with low Extraversion scores.

The relationship between Openness and Conscientiousness was also negative ($r = -.30$, $r^2 = .09$, $N = 96$, $p < .005$). A high degree of Openness was associated with a relatively low Conscientiousness score (see *Table 6. 23*). This combination normally relates to academic performance. Costa and McCrae (1992) indicated that an HE student was likely to be open to new ideas and receptive to change, giving a high Openness score. High Openness is seen in those with a broad range of interests and imagination. Low Conscientiousness suggests a ‘disinterest’ in planning and lack of organisation, but also potentially a flexible approach. Conscientiousness had the greater negative skew ($-.20$) of these two factors (Openness $-.10$). A negative relationship was also found between Neuroticism and Conscientiousness ($r = -.22$).

Correlations	N=96	T-score Neuroticism	T-score Extraversion	T-score Openness	T-score Agreeable ness	T-score Conscientio usness
T-score Neuroticism	Pearson Correlation Sig. (2-tailed)	1	-.43(**) .000	-.02 .879	-.06 .551	-.22(*) .035
T-score Extraversion	Pearson Correlation Sig. (2-tailed)		1	.04 .970	.15 .156	.13 .204
T-score Openness	Pearson Correlation Sig. (2-tailed)			1	.09 .397	-.30(**) .003
T-score Agreeableness	Pearson Correlation Sig. (2-tailed)				1	.06 .539
T-score Conscientiousness	Pearson Correlation Sig. (2-tailed)					1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 6. 23 Big-5 Personality factor correlations

Big-5 - Cluster Analysis using *t*-scores

K-mean analysis split the cases into two clusters, of 22 and 74 people (see *Table 6. 24*).

The data demonstrated no division by gender. The maximum *T*-score was 85 and the minimum 15. The distinctive feature of the clusters was whether Neuroticism had the highest mean score with Conscientiousness low or not. Cluster 2 showed ‘average’ means across the factors, for 75% of respondents.

Final Cluster Centres	Cluster	
	1, N=22	2, N=74
T-score Neuroticism	73	54
T-score Extraversion	40	56
T-score Openness	56	53
T-score Agreeableness	40	46
T-score Conscientiousness	34	46

Table 6. 24 Big-5 K-mean Final cluster centres

Late identification might have played a part in Cluster 1’s prevailing personality traits. Identification after A-levels was the case for 12 students and a further two at A-level, whilst only four were identified in primary school (see *Section 7.2.1 – Response to identification in HE*).

The results of an ANOVA showed which variables were most important in each cluster. The F ratio is the ratio of cluster variance to error variance. Large F ratios (those in the 20s and upwards) indicate variables that are important for separating clusters, while low values (near one) mean variables do not contribute to identifying the clusters. For this sample,

Neuroticism and Extraversion were shown to be by far the most important variables in identifying cluster membership (see *Table 6. 25*).

ANOVA	Cluster		Error		F	Sig.
	Mean Square	df	Mean Square	df		
T-score Neuroticism	6419.19	1	106.37	94	60.35	.000
T-score Extraversion	4326.01	1	74.96	94	57.72	.000
T-score Openness	192.57	1	108.80	94	1.77	.187
T-score Agreeableness	529.39	1	137.80	94	3.84	.053
T-score Conscientiousness	2211.70	1	103.63	94	21.34	.000

The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Table 6. 25 Big-5 K-mean ANOVA

The outline profile for Cluster 1 was spontaneous rather than given to planning, open to new ideas and perhaps having difficulties dealing with stress (see *App. 6.93*). Cluster 2 was a borderline high mean score for Extraversion, implying an assertive, talkative and optimistic personality who is committed to their goals (see *App. 6.94*). The Euclidean distances between the final cluster centres (28.4) was small, indicating that the clusters were not very distinct. No individual cases were clearly representative of either component, suggesting the potential profile would be hard determine manually (see *App. 6.95*).

Summary – Personality

The personality inventory showed three significant correlations between four of the personality domains, the strongest one being a negative relationship between Neuroticism and Extraversion. There was also an inverse correlation between Openness and Conscientiousness. The third correlation, between Neuroticism and Conscientiousness, was also negative.

The data for dyslexic individuals showed the openness to new ideas that was to be expected from someone continuing into HE, combined with an easygoing attitude and lack of organisation and planning which was at odds with what is needed for further study.

K-mean analysis organized people in a way that reflected the mean scores for Neuroticism and Extraversion. Cluster 1 showed a high Neuroticism mean score, while in Cluster 2 Extraversion was highest, but in general the scores were average. Cluster 1 indicated a disorganised profile, self-contained, but willing to adapt. Being disorganised and stress

prone, as indicated by a high Neuroticism score, would make dyslexia more likely to flare up in new situations. Cluster 2 was outgoing, committed to goals and generally calm.

Dyslexic HE students showed a profile that was hard working, and conscientious, although over half indicated a reluctance to start work. The profile does fit a number of anecdotal views of dyslexic students. Firstly, that they have to work harder to complete work as it takes two or three times as long (Grant, 2005 p. 12). Secondly, that there can be a tendency to caution or perfectionism to compensate for difficulties, and finally that a hard-working regime of 'doing what has to be done' accounted for getting into university. The analysis suggests an active approach to learning in three quarters of cases, with good self-motivation and goal management.

6.3 Relationships between Measures

A series of analyses were undertaken to explore the relationships between the various measures using Pearson Correlations, factor analysis (PCA) and K-mean Cluster Analysis.

6.3.1 Correlations between the Measures

Pearson product-moment correlation was used to review combinations of the sub-totals and totals from different measures (Field, 2005; Pallant, 2005). The size of the sample has an impact on the significance of the relationships. The purpose was to address the research question (RQ2) that aimed to determine potential dyslexic profiles.

The only relationships seen between intelligences, as independently measured by WAIS-III indices and self-assessed by MI 'given' totals, were for MI Intrapersonal and Visual (N=53). The correlation was relatively small for Intrapersonal with VCI ($r = .280$ $p < .05$). The correlation for both Intrapersonal with PSI ($r = -.325$ $p < .05$) and Visual and POI ($r = .330$, $p < .05$) could be taken as moderate (see *App. 6.96* and *App. 6.97*). No significant correlations were found between IQ (WAIS-III) and Personality (Big-5).

Openness of personality (*T*-score) showed strong or moderate correlations with several aspects of MI, for both 'given' (see *App. 6.98*) and Ward's linkage generated totals (see *Table 6. 26*). The MI cluster MI-G1 tended to be more self-contained and marginally more conscientious when personality was analysed (see *App. 6.99*). Potentially this group had less scope for success in non-academic areas because of their focused approach. A new variable was calculated, tallying the total MI 'Yes' responses per case, and included in the

correlation in order to investigate whether a positive response to specific questions was more important than the total ‘Yes’ count.

The MI total variable showed positive correlation with the Openness score ($r=.444$, $r^2=.197$, $p < .01$) (see *Table 6. 26* for relationships of interest, ordered by r value). Only the Existential question response total and two of the MI Ward totals (Natural and Intrapersonal), showed a similar or stronger relationship with Openness.

Openness amongst other things seemed positively related to MI Verbal (use of the written word). There were small statistically significant negative correlation between MI Existential and Big-5 Conscientiousness ($r= -.216$, $p< .05$) and MI Kinaesthetic and Big-5 Neuroticism ($r= .230$, $p< .05$) (see *App. 6.98*). Neuroticism showed the least relationship with the MI data. The scope of interests shown in MI seemed to be more important than individual areas; however the deeper reflection covered by the Existential questions was an exception. The Auditory sub-total of VARK showed a moderate correlation with MI Interpersonal scores ($r= .337$, $p < .01$), yet proved a variable likely to be removed early during factor analysis. Learning by Reading / writing showed a small negative relationship to MI Kinaesthetic ($r= -.295$, $p < .01$).

Variables	Sample	r =	Sig.
<u>Strong Correlation</u>			
Big-5 Openness with MI Ward Naturalist	92	0.582	.000
Big-5 Openness with MI Existential	92	0.546	.000
<u>Moderate Correlation</u>			
Big-5 Openness with MI Ward intra	92	0.445	.000
Big-5 Openness with MI total	92	0.444	.000
Big-5 Openness with MI Intrapersonal	92	0.405	.000
Big-5 Openness with MI Ward anti-verbal	92	0.386	.000
Big-5 Agreeableness with MI interpersonal	92	0.380	.000
WAIS – VCI with VARK Read/Write	56	0.349	.008
Big-5 Extraversion with MI kinaesthetic	92	0.336	.001
VARK Auditory with MI interpersonal	140	0.337	.000
Big-5 Extraversion with MI Ward music inter	92	0.322	.002
Big-5 Openness with MI Verbal	92	0.304	.003
Big-5 Extraversion with MI Ward kinaesthetic	92	0.304	.003
VARK Read/Write with MI kinaesthetic	140	-0.295	.000

Table 6. 26 Relationships of interest between questionnaire sub-totals, Pearson correlations sorted by r values [Big-5, MI, VARK, and WAIS]

Some sub-total variables showed a relationship because they were measuring aspects of the same thing directly such as Agreeableness and Interpersonal Intelligence. Other correlations suggested a common underlying factor of which the two variables both

described aspects, such as VARK Auditory and MI Interpersonal in relation to communication. The stronger the correlation, the more closely they described same underlying factor.

6.3.2 Combined Sub-totals Factor Analysis

An investigation searched for a representation of the measures that produced the best component structure and accounted for the most variance, ideally a 'simple structure' (Thurstone, 1947) cited in Pallant (2005, p. 176).

'To do a factor analysis we need to have variables that correlate fairly well, but not perfectly'
– Field (2005, p. 648)

Factor analysis (PCA) was used with all the available sub-totals and alternatives in several combinations, using the listwise approach to missing data (see *Appendix 6.3.2*). The anti-image correlation matrix values were used to determine which variables could be removed with little impact (Field, 2005 p. 642). A Varimax rotation was then used (see *App. 6.102*).

Where WAIS was included, the sample numbered 34. As the collection of WAIS data had not been part of the original plan it was excluded from one set of trials, giving a sample of 82; the further exclusion of BDA gave a sample of 92. Including WAIS variables gave only a very small sample with a borderline Kaiser-Meyer-Olkin Measure (KMO) of sampling adequacy (see below and *App. 6.100*). The analysis is reported here because the inclusion of WAIS led to a simple structure without overlaps. A slightly stronger indication of sampling adequacy for factor analysis was seen when WAIS values excluded (see *App. 6.103*), but there was an increase in cross loading between variables. Both combinations were included for completeness and as a guide for future research.

The best structure, including WAIS, only retained WMI and used the 'Yes' totals for MI and BDA, Big-5 (excluding Conscientiousness), and VARK – Kinaesthetic. The combination gave a low KMO of .57 (sig. .002), indicating that it was marginal as to its suitability for factor analysis (see *App. 6.100*) Although the Eigen values (see *Table 6. 27*) indicated three possible factors, the scree plot 'elbow' or point of inflexion, which marks a radical reduction in gradient was less clear (see *App. 6.101*). The smaller the sample, below 200, the less reliable the scree plot (Stevens, 1992 p. 382) cited in Field (2005). A larger sample would have helped, but the structure found did not have any cross loading above .3 and accounted for 61.45% of the total variance with three components.

Total Variance Explained						
Component N = 34	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.12	26.44	26.44	2.12	26.44	26.44
2	1.99	24.90	51.34	1.99	24.90	51.34
3	1.19	14.89	66.23	1.19	14.89	66.23
4	0.83	10.32	76.56			
5	0.70	8.80	85.35			
6	0.53	6.58	91.94			
7	0.35	4.38	96.32			
8	0.30	3.69	100.00			

Extraction Method: Principal Component Analysis.

Table 6. 27 Combined measures with WAIS – Total variance

A direct Oblimin rotation established that it was reasonable to assume that the factors were not related, and as a result a Varimax rotation was used for three factors. The sample size modified the loading level that was considered significant within the latent factors. A loading value cut-off point of .722 could be taken as significant for a sample size of 50 (Stevens 1992, p. 382) cited in (Field, 2005). Loadings of around .80 were generally considered relevant to describing the underlying factors in this analysis (see *Table 6. 28*).

Rotated Component Matrix ^a N = 34	Component		
	CmbW 1	CmbW 2	CmbW 3
t-score Extraversion	0.86	-0.13	0.11
t-score Neuroticism	-0.80	-0.11	-0.14
t-score Agreeableness	0.65	-0.10	-0.05
BDA total	-0.14	0.81	0.01
WMI ss	0.01	-0.78	-0.03
Kinaesthetic Learner	0.01	0.69	0.19
t-score Openness	0.04	0.05	0.92
MI total	0.12	0.15	0.88
Rotation Sums of Squared Loadings			
Total	1.82	1.80	1.68
% of Variance	22.80	22.47	20.96
Cumulative %	22.80	45.27	66.23

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Table 6. 28 Factor analysis of combined measures with WAIS, three component rotation matrix

A simple structure was exposed. Components 1 and 2 each included a variable with negative loading showing an inverse relationship to the others. Component 1 (CmbW 1) covered coping approach and outgoingness. The second component (CmbW 2) covered dyslexia. The BDA dyslexia checklist total was the most important variable, against which Working Memory Index showed a negative role in the component; the Kinaesthetic

learning style showed a positive role. In the third component (CmbW 3), Big-5 Openness to experience and Multiple Intelligences total score showed high positive loading. The rotation needed to give these factorisations was mostly large (see *App. 6.102*).

The variable descriptions were summarised to label the component (see *Table 6. 29- Table 6. 31*). Sources for the descriptions included the Big-5 handbook (Costa and McCrae, 1992), WAIS (see *Appendix 3.4 i.1*), <http://surfaquarium.com/MI/profiles/index.htm> for Multiple Intelligences according to McKenzie, (see *Appendix 3.4 i.2* - for alternative descriptions of intelligences), and <http://www.vark-learn.com/english/page.asp?p=helpsheets> for VARK. The more stress and Neuroticism seen in CmbW 1 indicates less Extraversion and Agreeableness expected (see *Table 6. 28*).

Outgoing, active, high spirits, sociable verses value privacy, reserved, serious, alone or few close friends	<u>Outlook – personality based coping strategy</u> : reserve, stress handling, cooperativeness
Stress level, emotional adjustment, or stability. Tendency to experience negative affects – fear, sadness, embarrassment, anger, guilt, and disgust.	
Altruistic, sympathetic to others and believes others will be equally helpful	

Table 6. 29 Combined measures with WAIS PCA component 1 (CmbW 1)

There is an inverse relationship between the dyslexic difficulties reported and the number and sequencing abilities indicated by the WMI (see *Table 6. 30*).

Sequence and memory problems associated with dyslexia	<u>Dyslexia: memory, sequencing, learning mode</u>
Number ability and sequential processing: responding to oral stimuli that involve the handling of numbers and/or letters in a step-by-step, sequential fashion and requiring a good non-distractable attention span for success.	
Do or experience rather than explain, action to understand – needs to be relevant	

Table 6. 30 Combined measures with WAIS PCA component 2 (CmbW 2)

Intellect introspection, reflection, preference for variety, curiosity, independence of judgement, conventionality, divergent thinking	<u>Openness / adaptable</u> : self awareness
Wide interests and holistic view	

Table 6. 31 Combined measures with WAIS PCA component 3 (CmbW 3)

The best alternative to using all measures was to focus on MI, VARK and Big-5, excluding WAIS and BDA data, as this showed a greater suitability for factor analysis. VARK considered with MI questions and Big-5 results could offer a means to identify study personalities as defined by Cottrell (1999) (see *Section 2.2.3 – Learning personality*). The final combination was MI (given), VARK (excluding Auditory), Big-5 (excluding

Neuroticism), which gave a KMO of .73 and the variance accounted for was comparable at 60.36%, with five components (see *App. 6.103–App. 6.106*). The number of factors extracted was five, based on Eigen value > 1. For the rotated components see *Table 6. 32*. Loadings of .51 or greater were generally considered relevant to describing the underlying factors in this analysis (N=92).

The five components or factors covered were: Existential and Openness Cmb 1; Interpersonal and Agreeableness Cmb 2; Logical and Conscientious Cmb 3; Read to learn inverse Extraversion Cmb 4; and Visual and Kinaesthetic Learner Cmb 5 (see *Table 6. 32*). Cmb 1 reflects the breadth of interest that might be expected in Cottrell’s Searchlight study personality, while Cmb 3 measures the organisational preferences that could indicate a Logician (see *App. 2.8*). Cmb 2 shows degree of strength in communicating with others, possibly associated with a Dreamer. The extrovert aspects of Cmb 4 may contribute to the Diver persona. There is no direct correspondence between the modes of Cmb 5 and Cottrell’s study personalities.

Rotated Component Matrix(a) N = 92	Component				
	Cmb 1	Cmb 2	Cmb 3	Cmb 4	Cmb 5
Existential	0.82	0.17	0.13	-0.09	0.00
t-score Openness	0.79	0.04	-0.18	0.09	0.08
Intrapersonal	0.59	0.21	0.07	0.24	0.03
Verbal	0.57	0.10	0.14	-0.03	-0.51
Interpersonal	0.26	0.81	0.11	0.09	-0.09
t-score Agreeableness	0.03	0.69	0.04	-0.06	0.29
Musical	0.32	0.51	0.15	0.20	0.09
Logical	0.02	0.11	0.80	-0.02	-0.06
t-score Conscientiousness	-0.43	0.01	0.60	0.18	-0.11
Visual (MI)	0.43	0.09	0.59	0.11	0.19
Read to Learn	-0.06	0.19	-0.11	-0.74	-0.17
t-score Extraversion	-0.13	0.43	-0.08	0.68	-0.21
Kinaesthetic (MI)	0.21	0.25	0.48	0.54	0.19
Naturalist	0.46	0.21	0.08	0.50	0.13
Visual Learner	0.00	0.17	-0.14	0.00	0.74
Kinaesthetic Learner	0.15	0.05	0.28	0.20	0.59
Rotation Sums of Squared Loadings					
Total	2.79	1.85	1.81	1.76	1.44
% of Variance	17.44	11.59	11.34	10.99	9.01
Cumulative %	17.44	29.03	40.37	51.35	60.36

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a - Rotation converged in 8 iterations.
Bold – highest loading in factor, *2nd highest loading*

Table 6. 32 Combined measures rotated component matrix (5) – excluding WAIS and BDA

There was no cross loading (above the .3 level) between the leading factor in each component. Component 1 (Cmb 1) had the highest loadings on Existential and Openness. This factor related to breadth of interests, independent thought and a curiosity that included reflection on oneself. Intrapersonal suggests that part of this factor was the ability to be quite self-contained with an underlying interest in verbal activities. The second component (Cmb 2) covered Interpersonal supported by Agreeableness. This factor was characterised by awareness of others, willingness to cooperate or compete, the ability to communicate and socialise, gregariousness. The third component (Cmb 3), Logic and Conscientiousness, covered the factors underpinning an ordered approach, based on self-control and seeing the patterns in activities. The factor indicated to what degree a student was driven by goals. The remaining clusters covered information gathering / handling. Text-based mode of learning in the fourth component (Cmb 4) was seen to be inversely related to Extraversion and doing, and dexterity or co-ordination. The only consistent response to an Extroversion question (79% of cases) related to *enjoy talking to people*. The final component (Cmb 5) was dominated by the Visual learner and covered spatial awareness, preference for images and the importance of presentation; to some extent, Kinaesthetic learning related to the need for visual input.

Auditory learning was one of the first variables to be dropped for all the combinations investigated, suggesting that it is a universal issue for dyslexics.

6.3.3 Combined Sub-totals Cluster Analysis

The combined sub-totals suggest a certain commonality for dyslexics, showing that they tend to compensate for problems by greater conscientiousness and pro-active approaches to learning arising from heightened meta-cognitive awareness.

Matched data was essential for cluster analysis, where participants were grouped according to WAIS profiles, because the inter-variable relationship was being considered. K-mean analysis was used to look for clusters of cases (see *App. 6.107* and *App. 6.108*). An acceptable sample size for this measure would be 200 (SPSS Statistics coach v12, n.d). The available sample was already much smaller and could not be approached as separate male and female samples. Gender not being a continuous variable could not have been simply included in the variables analysed. This analysis can not offer any conclusions but could highlight areas for future investigation.

Using two clusters gave the best results. The final cluster centres (see *Table 6. 33*) indicated the mean value for each variable in each cluster. The prototypical first case cluster (Cmb cl1) showed the highest POI mean of 125 and a low mean of 92 for WMI. The second cluster (Cmb cl2) had a very low mean for WMI of 86 and a substantially decreased mean for POI dropping below VCI. VCI and PSI were also lower than in the first cluster. The distance between final cluster centres and ANOVA covered the importance and distinctiveness of variables and clusters (*App. 6.107*).

Final Cluster Centres N = 32	Cluster		Range	
	Cmb cl1	Cmb cl2	min	max
VCI standard scores	114	112	0	150
WMI ss	92	86	0	150
POI ss	125	102	0	150
PSI ss	97	91	0	150
BDA total	12	12	0	20
BDA tot Ward Hcluster 1	0.44	0.52	0	2
BDA tot Ward Hcluster 2	0.83	0.71	0	2
Visual Learner	3	4	0	12
Auditory Learner	4	4	0	12
Read to Learn	3	4	0	12
Kinaesthetic Learner	5	6	0	12
t-score Neuroticism	62	66	26	74
t-score Extraversion	51	50	26	74
t-score Openness	52	55	26	74
t-score Agreeableness	43	46	26	74
t-score Conscientiousness	47	38	26	74
Naturalist	6	5	0	10
Musical	5	6	0	10
Logical	6	5	0	10
Existential	6	5	0	10
Interpersonal	5	5	0	10
Kinaesthetic	7	6	0	10
Verbal	3	3	0	10
Intrapersonal	8	8	0	10
Visual	6	4	0	10
MI total	53	47	0	90
Case Totals	17	15		

Table 6. 33 Combined measures K-mean final cluster centres mean scores [matched WAIS]

Considering the variables’ means in the components, they can be given a textual description (see *Table 6. 34*). There was no difference between the clusters for the BDA mean score (12). Good vocabulary and verbal expression, with ability to handle oral stimuli, was seen for both clusters.

Cluster 1 Cmb cl1	Show Superior perceptual organisational (POI) abilities, very good at visual non-verbal thinking, problem solving and coordination. Average working memory skills, which suggested fair number and sequential processing skills, and an ability to handle oral stimuli combined with an average attention span. Answered more MI questions, most noticeable for Visual Intelligence, indicating a wider range of interests. Average Conscientiousness, average Neuroticism.
Cluster 2 Cmb cl2	Show an Average POI mean for nonverbal thinking and visual motor coordination. Low average WMI indicating distractibility might be a problem. Slightly more inclined to use of Text and Kinaesthetic approach to learning than Cluster 1. Low average Conscientiousness, borderline high average Neuroticism.

Table 6. 34 Description of the combined measures K-mean clusters

Variables could be significant because their mean score was low. The F ratio is the ratio of cluster variance to error variance. Small F ratios (near 1.0) indicate variables that are not very useful for identifying cluster membership. The variables that were most important to the cluster solution were shown in *Table 6. 35*. For each variable, it is possible to see the variance attributable to clusters in the Cluster mean square. Large F ratios indicate variables that are important for separating clusters, values of 25 upwards. POI WAIS index was by far the most important variable in these clusters.

ANOVA	Cluster		Error		F ²	Sig.
	Mean Square	df	Mean Square	df		
VCI standard scores	29.54	1	118.22	30	0.25	.621
WMI ss	239.51	1	80.45	30	2.98	.095
POI ss	3967.66	1	90.24	30	43.97	.000
PSI ss	326.80	1	141.11	30	2.32	.139
BDA total	0.38	1	11.85	30	0.03	.858
BDA tot Ward Hcluster 1	0.05	1	0.05	30	0.97	.333
BDA tot Ward Hcluster 2	0.11	1	0.03	30	3.61	.067
Visual Learner	14.17	1	6.11	30	2.32	.138
Auditory Learner	0.29	1	6.16	30	0.05	.828
Read to Learn	8.35	1	3.90	30	2.14	.154
Kinaesthetic Learner	0.49	1	6.65	30	0.07	.789
t-score Neuroticism	127.00	1	168.00	30	0.76	.391
t-score Extraversion	7.30	1	125.07	30	0.06	.811
t-score Openness	112.71	1	106.31	30	1.06	.311
t-score Agreeableness	92.12	1	125.05	30	0.74	.398
t-score Conscientiousness	665.31	1	137.32	30	4.85	.036
Naturalist	2.47	1	4.05	30	0.61	.441
Musical	4.66	1	4.17	30	1.12	.299
Logical	10.45	1	2.97	30	3.52	.070
Existential	0.31	1	9.32	30	0.03	.857
Interpersonal	1.74	1	2.86	30	0.61	.442
Kinaesthetic	20.50	1	5.13	30	3.99	.055
Verbal	3.67	1	3.50	30	1.05	.314
Intrapersonal	0.53	1	5.05	30	0.11	.747
Visual	36.94	1	5.08	30	7.28	.011
MI total	265.90	1	133.00	30	2.00	.168

Bold text – most important variables determining clusters.

Table 6. 35 Combine measures K-mean ANOVA

Large Euclidean distances values between the final cluster centres, of 80 and upwards, would indicate clusters that were very different from each other. In this research, the value was 27.30, which suggested they were quite similar to each other. The patterns in WAIS indices, although distinctive, do not form unique clusters, but still suggest coherence between dyslexic students’ score patterns compared to the expected pattern. For age, gender, details of cluster membership and Euclidean distance from the cluster centre, see *App. 6.107*. Hardly any cases can be considered representative as their distance from the cluster centre exceeds 25.

² The F tests should be used only for descriptive purposes because the clusters have been chosen to maximize the differences among cases in different clusters. The observed significance levels are not corrected for this and thus cannot be interpreted as tests of the hypothesis that the cluster means are equal.

Using the same 'best alternative' data as in *Section 6.3.2*, MI, VARK and Big-5 were also analysed for case clusters (N=92). Again, two clusters (CmbA cl1 and CmbA cl2) produced the highest F-test ratio results; those of 25 and over were important in separating the clusters: Big-5 Extraversion (F=53.7); and Neuroticism (F=53.5); MI Kinaesthetic score (F=24.4) and MI total score (F=24.2) (see *App. 6.108*). The Euclidean distance between final cluster centres was 25.5; this small distance indicated that the difference between clusters was limited. In four cases, the distance between the case and the cluster centre mean was less than 15, two from each cluster, and these were the most representative cases of the sample. A distance of four would have made a case typical of the cluster.

CmbA cl1 (N=43) looks more likely to become stressed, which exacerbates the problems of dyslexia, to be the least likely to make plans, and to appear more serious and more solitary. CmbA cl2 cases (N=49) seem more open to change, less self-contained and more trusting, much more kinaesthetic, and with a wide range of interests. Consideration of the responses to each Conscientiousness questions would give an insight into individual perceptions of organisational, time management and productivity skills, and methodical, perfectionist elements of personality.

Neither K-mean clustering showed major differences between the clusters, although more variables were important in distinguishing the clusters in the second version (CmbA), which had cases that were closer to representing the sample. The initial clusters do not appear to be a sub-set of the alternative combination of measures, as only 40 % of cases in the Cmb clusters corresponded to gender and clustering of CmbA clusters. The variation in clustering of common cases between the two samples supports the WAIS variables having a strong influence. (See *Section 8.3.2 – Clusters and support use*).

6.4 Summary

This chapter has attempted to determine the characteristics of the dyslexic population. It was hoped that responses to the measures would illustrate specific impairments, including literacy, as experienced by the participants, which might show associations with gender and age details, and resulting behaviours or strategies.

Overall dyslexics seemed to be a homogenous group, within HE students. There were distinct responses to Big-5 and MI, with at least 75% consistency. These might be

indicative of dyslexic or HE students or simply adults, and this needs further investigating. The VARK profile of the dyslexics at the RI was different to that of HE students as a whole. The personality scores suggested that dyslexics who went to university were self-reliant in their studies, while MI showed awareness of study strategies. Narrower interests expressed by low MI scores reflected a personality less open to change but more conscientious (MI-G1).

6.4.1 Key findings

Factor analysis indicated underlying concepts that had been tested indirectly – outlook or strategies, dyslexia form and Openness or adaptability. For the role of personality in the experience of dyslexia, coping strategies, and Learning Mode preference, NEO-FFI / Big-5, VARK and MI were considered. Only a limited number of sub-total elements showed any correlation between questionnaires, and these were predominantly between personality (Big-5 – Openness especially) and multiple intelligences.

Gender was initially thought likely to have a significant impact on personality development as a result of the student's experiences, and also to affect the responses to adversity and stress. However, very few indications of gender differences were found. A Pearson correlation calculated on a sample of 85 cases showed no correlation between any of the personality factors and the age at which dyslexia was recognised. Age was analysed in relation to identification and support use, and the results are presented in the next chapter.

WAIS

WAIS results did not match the normalised indices pattern, although PIQ and a VCI component were still detected in the factor analysis. At a cognitive level, WAIS indices helped to identify specific difficulties in the areas of working memory and processing speed as part of a dyslexic profile. The significant gender differences for WAIS were in VCI and POI, where dyslexic men at the RI showed a significantly higher mean.

Two underlying clusters emerged from the WAIS data (from Two-step) distinguished by POI results and the related WMI and PSI values. There were higher means in one cluster (Wcl 1) and the lower in Wcl 2. Both clusters of people scored well on Verbal Comprehension. Wcl 1 students used high POI problem solving and VCI verbal skills to compensate for average PSI and WMI means, and related to the combined measures K-mean cluster (Cmb cl1). Wcl 2 showed a very low WMI and PSI mean, and average POI

(see Table 6. 7) and reflected Cmb cl2. Wcl 2 cases were liable to distraction, were weak in both oral and sequential task, while speed of thinking about and doing non-verbal tasks was slow. POI was the only variable to distinguish between Cmb cl1 and Cmb cl2.

Section 6.3.2 showed an underlying component (CmbW 2) to which WAIS WMI scores inversely related to reported dyslexic difficulties (BDA) and preference of a Kinaesthetic mode of learning.

MI

MI provided an insight into study strategies and awareness. MI individual question responses of 'Yes' were most frequent for *I learn by doing, I can imagine ideas in my mind, and working alone can be just as productive as working in a group*. The most frequent negative responses were to *I can complete calculations quickly in my head, I dislike working alone*, and statements about writing by choice or fun. Gender differences proved significant for the given multiple intelligences of Interpersonal and Verbal, and to a lesser degree for Visual. High scores for MI Intrapersonal indicated a reflective or introspective personality. Results from the Hierarchical cluster analysis, that led to MI Ward's Intra category consisting of responses polarised to 'Yes', the given MI total, and PCA component MIcmp1 suggested the implicit dimension of self-awareness of study preferences. Self-knowledge and motivation are important qualities for a dyslexic in university.

BDA

As expected, this sample had high scores for the BDA checklist. BDA frequencies data showed reading, mental arithmetic, sequencing and spelling were key issues in participants' responses. A significant gender difference for BDA questions was found for handwriting legibility and a border-line one for difficulties distinguishing left from right.

BDA questions split in to two in the Ward clusters. One grouping covered questions on memory and aspects of processing speed, which were answered 'Yes' in 60% or more of cases. The second grouping was related to spatial awareness, speech processing, and co-ordination. The strongest correlation was between problems taking telephone messages and finding forms confusing. The other variable combinations were predictable: mental arithmetic problems correlated to difficulties learning tables; and reading pages slowly related to disliking reading long books.

VARK

Looking at learning mode preferences in this sample, a distinctive profile (Valley shaped) emerged based on the avoidance of text, with other modes being drawn on to compensate for weakness in the Read/write mode. The VARK profile was different to that for university students as a whole, showing a greater avoidance of text-based access to information. VARK showed no significant gender differences.

NEO-FFI / Big-5

Big-5 results for this sample fitted the design reliability test, giving the same factors. Reflecting on personality, the most common responses of the dyslexic sample included strong agreement with the statement *I work hard to accomplish my goals*, which was tempered by an awareness of a tendency to prevaricate in relation to study. The sample tended towards a self-centred or self-reliant approach, which was possibly a result of prior experiences.

This sample showed that 27% of cases were off the Big-5 t-score scale provided, with 11% showing scores for Agreeableness and Conscientiousness that were below the scale. Individual question responses for Conscientiousness, however, indicated a perception of effort and persistence in 75% of cases. Conscientiousness had a low score, suggesting a lack of engagement with planning and organisation.

Agreeableness covers how important 'self' is in terms of priorities and interactions, especially relating to conformity. Women were expected to score more highly on Agreeableness (Costa and McCrae, 1992), but this was not the case for this sample. The low scores for Agreeableness found for women in the sample indicated a self-contained or self-sufficient outlook.

High Neuroticism scores indicated the possibility that stress and frustration would be experienced more fully. Neuroticism was the only personality factor to show a gender difference, according to an independent *t*-test for Big-5. The handbook mentioned that women were more likely to show a higher score for Neuroticism and as this was borderline significant it was not thought very unusual.

Otherwise participants predominantly reported having clear goals, being methodical, organized, and tidy and able to pace their work. Finally, half the sample agreed, or agreed

strongly, that they were *reliable* and *dependable*. Although students appeared *productive* and able to get tasks completed, no question addressed the amount of time taken to complete tasks.

6.4.2 Factor Analysis

Factor analysis was used for data reduction (by PCA) in the search for dyslexia components that could be reviewed in the light of personality, or vice versa, and related to support usage. This analysis was carried out for individual measures and two variations of combined measures.

The components found for measures represent underlying latent factors. For WAIS the data components reflected PIQ even with the range of mean scores for the indices. For MI, components were meta-cognitive (MICmp 1) and learning mode (MICmp 2). Aspects of dyslexia being considered were literacy, processing and memory skills. The analysis of the combined group, WAIS, BDA, Big-5, VARK and MI gave a simple structure. The structure accounted for a large amount of variance (66%), although the sample was small (N=34). The structure consisted of three factors, which related to Outlook and Coping strategies (CmbW 1), Dyslexia – Memory and Study or Literacy skills (CmbW 2), Openness and Adaptability (CmbW 3).

Big-5, VARK and MI alone proved more suitable for factorising and produced five components, but not a simple structure. These factors included breadth and depth of interests (Cmb 1), gregariousness (Cmb 2), self-control and orderliness (Cmb 3), strategies to avoid text (Cmb 4) and non verbal acquisition of information (Cmb 5).

Results from MI data suggested the implicit dimension of self-awareness of study preferences. Overall the analysis showed the underlying factors, not explicitly tested, of Dyslexic profile (CmbW 2), Interaction (Cmb 2 and CmbW 1), Intellectual scope, curiosity or meta-cognitive skills (Cmb 1, CmbW 3), Drive (Cmb 3) and two that addressed aspects of information accessing preference (Cmb 4, Cmb 5).

6.4.3 Cluster Analysis

This dyslexic sample showed underlying commonality, with perceptual organisation emerging as the best way to distinguish between cases. K-mean cluster analysis of the combined measures grouped the cases into two components. The greater number of cases

(17 of 32) fell into Cluster 1 (Cmb cl1) with a very high POI (see *Section 6.3.3*). The K-mean clusters were not particularly distinct from each other according to the Final Cluster distances, and the case distances showed that virtually none of the cases were very representative of the clusters (see *App. 6.107*).

6.4.4 Conclusion

The results showed that for most dyslexic students, good high order thinking skills and self-knowledge formed the basis for pro-active approaches to learning arising from meta-cognitive awareness, leading to strong motivation and a good work ethic. The WAIS-III indices clusters (Wcl 1 and Wcl 2) offered the most distinct basis for a profile from a single measure, based on visual strengths (POI / PSI); these are investigated further in Chapter 8. The cluster analysis also revolved round POI values (see *Table 6. 35*). The absence of representative cases within the clusters reinforces the need to treat each support case as an individual within any generalised profiles that can be identified.

The next chapter looks at how the data analysed in this chapter are reflected in the handling of experiences of university, including support use and outcomes from PIP page data.

Chapter 7

HE Experience – Study Support and Outcome

7.1 Introduction

Chapter 7 addresses the second research aim and questions (see *Section 2.6.1*) to examine the actions and experiences of the dyslexic student population before and during their time at the RI, and the implications for good support practice. This involves considering approaches to registering and use of support (RQ3), on-going experience of studying in the RI (RQ4), and the academic outcome (RQ5). It also involves examining the age at which dyslexia was identified, and the factors that influenced the accommodation and perception of a student's previous academic experiences as manifested in behaviour at the RI.

The data considered here relate to the impact of experience and prior support on self-concept and motivation, and in relation to study, support use and outcomes. At a surface level the anticipated reasons for not using support were: the student did not perceive a benefit or need; embarrassment or self-consciousness (threat to status in new situation); lack of time; and an existing well developed knowledge of study skills. Coping with university does not only involve handling study; it also means dealing with course administration, especially on a modular course, and the process of getting dyslexia recognised officially, which can be time consuming and stressful. Official recognition had to be in place in a relatively short time at the start of a course to maximize dyslexia support. The final aspect, which will be considered, is the outcome and academic results of students. Outcomes of successful support might include: improved grades, retention on the course or the skills necessary for career development and future professional development studies, or any combination thereof.

Chapter 7 is more reflective than Chapter 6, with smaller sample numbers; the data is more suited to discussion and use of quotes, rather than simply statistics. This chapter gathered data from a number of questionnaires designed specifically for this research – Equipment and Support; Background Dyslexia; Course and Module Details – and other questionnaires in general use – Learning Mode Preference Inventory (VARK), results from Personal Information Portal (PIP) pages, Who-are-you (WAY) Statements – plus material gathered from interviews which addressed self-concept, study experiences and support use. References for quotations indicate gender (Interview and questionnaire F1-F31 and M1-M19) and the addition of 'Q' after gender indicated questionnaire-only (FQ1-FQ29 and

MQ1-MQ20) (see *Section 4.1.2 Ethics and data protection*). NVivo was used to manage the themes identified in WAY statements, responses to the open questions, and interview transcripts. Limited descriptive statistics were used to describe the questionnaire and theme data.

7.1.1 Sample

In Chapter 6 the data showed a commonality in responses to individual questions and measure totals, with the WAIS Perceptual Organisation Index (POI) underlying several of the combined measure grouping (variables and cases). The measures in this chapter did not generate totals, with the exception of VARK from the Main Survey. This chapter focuses more on responses to individual questions.

Of the 269 participants, the sample for Chapter 7 includes those participants who completed some part of the Equipment and Support measures (N=161, see *Table 5.9*). There were 66 participants who responded to both the Main and Support measures, and these cases are included in the sample discussed in both Chapters 6 and 7. There were 95 students who had only completed the Equipment and Support measures and not the main set (see *Section 5.5.2*), and thereby used the alternative entry route to this research (see *Figure 4.1*). Only 39 participants had responded to all the measures used in this chapter. For most of the analysis which follows, the sample size exceeded 100 (see *Section 4.1.2 – Statistical Analysis* and *Table 5.9* for measure sample gender data). Frequency statistics were calculated for the categorical data, indicating how many people gave each response.

The Background Dyslexia Questionnaire (N=160) showed that most of the sample (93%) spoke English at home. Nearly 20% had been recognised as dyslexic by the age of 11 (see *Appendix 7.1* and *Section 2.2.1* on the impact of late identification). Just over 33% of the sample had experienced compulsory education at a time when the emphasis on dyslexia awareness was greatly increased (post 1981).

7.2 Experience of Dyslexia in University

The *age on starting* the course was known for 1498 of the research population (17 to 61 years). About 25% were mature students (over-25 years), with proportionally more experience of life and of being dyslexic, recognised or otherwise, before starting university. The impact of age and dyslexia may not occur solely in study but also in the administrative side of university life, including registering for courses and support. Thus, a number of themes arose from the WAY Statements, which were considered to relate to the 'Experience of university life' rather than 'Study' (see *Table 7. 1*).

In total 1800 Who-are-you? (WAY) Statements were collected from 128 people, of whom 21 felt unable to complete all 15 '*I am ...*' statements, and only three failed to complete five statements. The WAY texts were analysed for themes, which formed the nodes; subsequently nodes were grouped into sets relating to an aspect such as 'Study' or 'Experience of university life'. Interviews and associated nodes such as study-environment, frustration, and dyslexia-in-the-family will be addressed in Chapter 8.

Who Are You?

The WAY statements produced 36 nodes; 335 passages fell into the 'Experience of university life' set (11 nodes), and two nodes overlapped between the sets, those of 'Struggle' and 'Tired'. The most frequently occurring statements (34%) related to being 'Happy' or 'Enjoying' some element of student life. Elements of 'Stress and anxiety' (nearly 18%) was the next most frequent node. 'Stress' appeared as a theme for 60 people (see *Table 7. 1*); 10 statements related to stress as a bad thing, two were not stressed, and two mentioned some stress (see *App. 7.13*). 'Busy' was mentioned by 10 people, and eight people 'Worried' about university in some way. For the 33 people referring to 'Struggle' (37 statements), most statements were related to study skills, some to social adjustment issues (8), while a few were course related (4). Four statements came under multiple nodes, each combination including 'Struggle'. What proved of interest was the part played by studies and dyslexia in WAY statement integral to defining 'I'. Only 1.3% of the statements mentioned dyslexia, and four of those 24 statements were positive comments (see *Table 7. 3*).

Themes	Passages	%
Happy	115	34.33
Stress & Anxious	60	17.91
Struggle	37	11.04
Confidence	25	7.46
Anger	23	6.87
Tired	19	5.67
Accommodation	18	5.37
Finance	18	5.37
Isolation	10	2.99
Experimenting	6	1.79
Concerns	4	1.19
Total	335	100

Table 7.1 WAY statements theme node figures for the ‘Experience of university life’

It should always be kept in mind that this data represents a snapshot, so transitory issues, aspects of normal student life, the impact of dyslexia and extra work, could underlie the statements.

7.2.1 Identification to Registering

This section looks at the experience of discovering, or confirming, dyslexia and of registering for dyslexic student support at university (RQ3). Judicious HE course choices, possibly as a result of school support, could have led to minimal support needs for some students, but the DSA benefits might have attracted more ‘first time dyslexic students’ to appear in HE during the period of the research. It is also likely that the increased demands of HE study made application for dyslexia support essential.

Once study at an HEI had started, the absence of an initial identification or any formal dyslexia report could add a term or more to the process of registering for support. There were often delays during the various stages of identification; for instance, several months might elapse before a Needs Assessment could be done and the student could receive associated equipment with support.

Response to identification in HE

There were no mass screening tests of new intakes at the RI, unlike at some HEIs. Some of the younger students were aware of their problems, having parents who had struggled for recognition or a ‘Statement’ without success, and were formally recognised for the first time in HE. Others had no idea that they had a specific learning difficulty or that there was even any problem, and were identified by staff as a result of their studies.

The identification timescale varied. Anecdotal evidence indicated that in the first year of study some students had difficulty in prioritising between course demands and the benefits of completing the identification process, drawing out the process of obtaining support even further. From the second year of a course, all results contributed to the class of final degree awarded, and this focused attention on the need to get support in place for anyone who had not followed up advice in the first year.

‘While the psychological assessment was fairly short in waiting time, I found three months waiting for a needs assessment far too frustrating. So much valuable time wasted. (MQ2)

In the pilot interviews, a female, final year architecture, student talked about going for dyslexia screening, describing how it had taken ‘nearly all year to get an appointment’. Although funding was in place for her Educational Psychologist’s report by the summer of her second year, the assessment and report were not complete until the Christmas of her third year, when her dissertation was due in just after Christmas. Her computer equipment actually arrived, as her final assignments were due. The overall impression was that registering for support had never been her top priority, but nevertheless, she wished it had happened sooner.

It was found that reaction to identification varied (Support – open question):

‘I hoped that my dyslexia would have been spotted (sic) before, and feel neglected by the education system.’ (FQ1 – questionnaire)

(see *Section 4.1.2* – Ethics and data protection, for details of quotation case codes).

The reaction could be influenced by the age at which dyslexia was finally recognised, and the decisions made based on concepts developed before the explanation of difficulties provided by dyslexia. Considering *age-identified* differences between Coates (2003) (see *Figure 2.1*) and this research, a greater percentage of early identified males continuing to the RI was seen (*Figure 7. 1*). In general, women were recognised at a later age in both sets of data (see *Sections 5.2.2* and *5.2.3*, and *App. 7.1-7.3*).

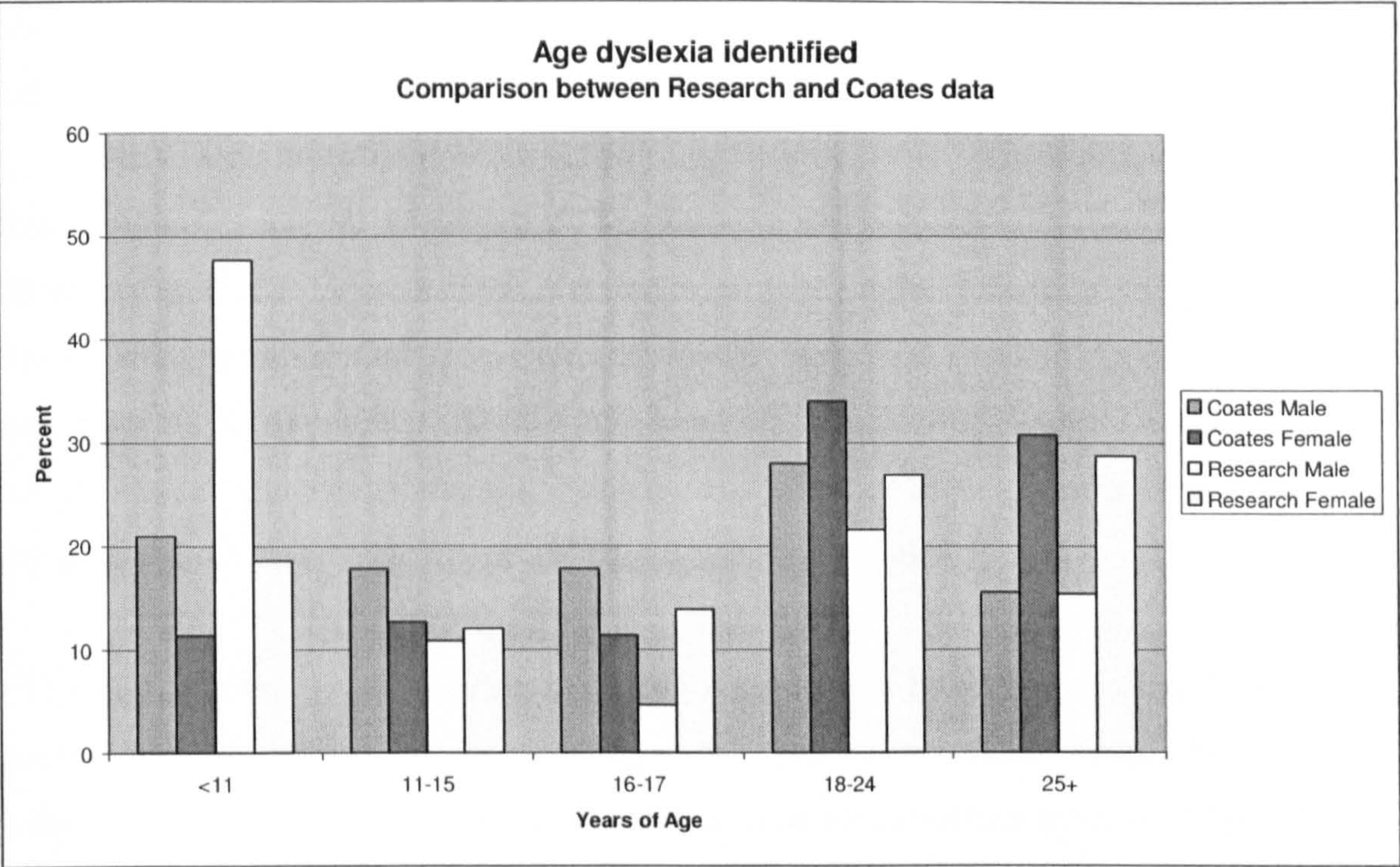


Figure 7. 1 Age at identification, research v. Coates (2003) data

One female student not identified until university, who had had a lot of parental support, and was successful in maths and music at school, gave her reason for taking part in the research as:

‘I’ve gone through such hassle and basically living hell some of the time, nothing can be done about what happened to me’
F3 (interview)

Comments on identification showed that it could be a long drawn-out process. M18 was a male postgraduate at the RI. He commented on his dyslexia recognition, at 23 or 24, prior to entry to the RI:

‘I felt annoyed that it took me paying for a test for it to be actually recognised. I was probably a bit annoyed that it had taken so long really.’

Even for those who were already aware of their dyslexia, there were numerous steps to be taken in order to get support in place. On needing yet another updated Educational Psychologist’s report, M14 commented:

‘I had to do one [dyslexia assessment] just before my A-levels. I had to do it again to get the extra time for my A-levels but apparently that was too long ago to be accepted now.’

Experience of dyslexia identification and assessment

The prospect of a formal assessment could produce fear that the informal explanation that had allowed a student to cope with situations so far might be removed. Instead of being dyslexic, it was feared that one might be ‘just lazy or stupid,’ as one student (F17)

observed. Students reported that most assessments were themselves positive experiences although the subsequent impact was sometimes difficult to accommodate.

Reaction to the assessments varied. F10, a female undergraduate identified at university at 26 years old, found the assessment experience hard to handle. Although she talked to friends afterwards, she said, 'I was incredibly angry and cried a lot.' Most of the anger was 'directed at my parents, and then my secondary school.' 'I did not do any talking [to my parents] for quite a few months, I yelled a lot.' For her 'It was unbelievable, because my parents both teach. I just assumed they would pick up on it.'

F17 spoke of being 'upset', fearing she might actually 'just be stupid' and finally, with confirmation of her dyslexia, experiencing anger. The most frequent phrase, though, was 'relief', which occurred 20 times in the statements on identification from the 30 people who mentioned their reactions. One person mentioned relief three times. Eleven people mentioned feeling anger or frustration, while six people were surprised, four were not, and eight either cried or were upset. Only one person mentioned feelings of depression for several months, but two were 'worried' about others who might go through the same experience and became actively involved with their departments to help other students. Some students, including M6, were euphoric about being understood and 'treated as normal'.

Having been provided with some information on the nature of the dyslexic difficulties through an Educational Psychologist's report, most eligible students went on to apply for the Disabled Students' Allowances (DSA).

Needs Assessment – DSA

The Needs Assessment aims to bridge the gap between the difficulties and differences reported by the psychologist and the study demands of university. It is in no way intended to offer extra teaching in the subject itself, but rather to provide tools and support to ensure that course content can be fully accessed. Self-funding for a Needs Assessment is very unusual; the presence of an equipment recommendation in the survey therefore indicated that a DSA application had been made. In parallel to arranging and receiving this assessment, registering with Student Services could be completed on acceptance of the Educational Psychologist's report.

When experiences of access to support (RQ3) and the DSA were analysed, using the Equipment Questionnaire (N=128 with Needs Assessment see *Table 5.9*) and considering answers to individual questions, it was found that 43% of the students had had *to wait one to two months* for their DSA Needs Assessment. However, 22% (28) of respondents were *offered an earlier appointment* at alternative assessment centres. Only 125 of the Equipment Questionnaire sample answered questions about their Needs Assessment, but 94% (118) of those that did felt that they had been clear about *the purpose* of the assessment and 93% (119 of 128) felt that the *assessment covered* everything. Some 95% (118 of 124) of those who replied felt that their *report reflected* their actual assessment. On the issue of what would happen next, 81%, (101 of 125) were positive about the next step to take. It should be noted that the introduction of 'what-happens-next' sheets to cover the process of receiving the report and arranging the payments for equipment and support was established in some assessment centres during the research period. The sheets, which were produced in the centres local to the RI, indicated the order of future actions required, with an indication of the current time scale, and contact information.

Nine students specifically thought they had not applied for DSA, yet eight of them also indicated that they had had a Needs Assessment. Just one of these students was not clear about the assessment's purpose, and five reported equipment recommendations from the resulting report. This reflected some uncertainty regarding an individual's source of support provision, whether it was the university or the DSA via the funding body, and how to access the funding. This confusion may have slowed down the process of providing the information needed to relevant bodies, which was needed in order to put support in place. 'The length and complications in the application for the DSA!' was a source of frustration for one interviewee (F9).

Where the open questions or comment boxes were used, the sentiments tended to be stronger and wider ranging. One response arising from questions about Needs Assessments:

'Slightly off subject from Equipment Questionnaire – I think it is wrong of the department to advise people to get equipment from there (sic) LEA's. This scheme should be means approved, wealthy (sic) students are getting thousands of pounds of equipment, (MD player / rec which will never be used to record a lecture etc) Whilst other students are struggling (sic) to pay their fees.' (MQ18)

Registering for support

'Time it takes to register as a dyslexic is too long' (M10).

There is no requirement for a student to notify the institution that they have successfully applied to their funding body for the DSA (see *Section 1.2* and *2.4.2* for DSA), so it is not automatically the case that a DSA recipient is known to the institution. One possible reason for a student's decision not to notify the HEI could be the nature or requirements of the course of study.

For 110 participants there was known data related to the time at which they registered with Student Services (see *Sections 1.2.3* and *2.5* for registration details). It was found that 9% registered in their final year; the peak for this sample was 50% in the first year, first term (see *App. 7.4* and *App. 7.5* for charts). Being registered for support is not necessarily the same as starting support, especially if one-to-one tuition was involved, and meanwhile study continued.

Overall, 15 people reported receiving *ad hoc* guidance on equipment and support with study skills. A self-funded student had problems fitting into a system that expected her to be part of the DSA and going on to have a Needs Assessment.

‘The lack of support I received – Post assessment meeting to discuss

1) findings, 2) self help e.g. useful reading handouts from workshops. (I requested these by e-mail and telephone on two occasions (sic) without luck?!) 3) support available to me.

I believe the assessment was a total waste of resource.’

(FQ21)

More students felt that:

You all have been approachable, friendly and most enjoyable to talk to. Particularly I would like to thank [tutor] for her inspirational approach to our common problem.’

(MQ2)

Summary of Identification, Needs Assessment and Registering

Several points came out of this section. Firstly, the data was found to support the gender bias in the delayed recognition of dyslexia shown by Coates' (2003). Secondly, confusion was revealed between the sources of support and the steps necessary to get it in place. Thirdly, it was shown that there were difficulties in prioritising between course demands and the registration; and finally, the timescale involved was often underestimated. In comparison to Coates' (2003) data, the RI attracted more, well-established dyslexics, especially males, which probably reflects the early establishment of a reputation for dyslexia support amongst school support tutors.

7.2.2 Studying – On-going Learning Experience

While the student is going through the process of registering for support, study in the HE continues. This section reviews the experience of study in HE (RQ4), what was studied, and issues relating to the process of studying.

Not surprisingly, 91% of participants gave wanting ‘to get a degree’ as a reason for entering HE (see Table 7. 2, and App. 7.6 for full tables). ‘Interest’ and ‘proving to myself I can’ followed closely in importance. Few rated ‘no idea what else to do’ as a significant reason for being on their course, although it was largely true for five people. Two of these people were not interested in their subject; one was trying to prove to herself that she was capable of achieving a degree; another felt family and peer pressure. These motivations were counter-balanced by two students who were greatly interested in their subject and proving that they were capable, but were not bothered about getting a degree.

Reason	N = 141	Impact on choice	
	Responses	Quite a bit - %	Great deal - %
Friends' decisions to go to HE	126	16	7
Want a degree	128	11	80
Prove to myself I could	129	26	57
Needed a degree for career	128	18	54
What else to do?	126	11	4
Interest in subject	128	30	57
Parents expectation	123	16	9
Other	24	21	54

Table 7. 2 Reasons for taking a course – summary [Course]

While the course choice was usually made before registration was complete (see App. 7.7 for most frequent fields), a few participants changed course by the end of the first year. Nationally, dyslexic students showed greater numbers studying engineering, architecture, and agriculture than for the total undergraduate population (see Section 5.2.4 - Field).

It was of interest to see whether the format of modules (assignments and exams) versus content influenced the choice of modules within a subject. Potentially different module formats might have suited particular cognitive profiles and influenced the meta-cognitive strategies that were generated. These responses also gave an indication of the learning approach in use. Whether a student was on a course with exams could be ascertained from a number of sources. Of the 141 Equipment Questionnaire sample, 136 people indicated whether their course had exams (87% ‘Yes’). From the same source, 138 indicated whether their courses included a placement, which was the case for 68 people (49%). Although the degrees were mostly modular at the RI, in some courses the modules were closely prescribed, which meant that the selection did not reflect the students’ preferences,

while others had free choice with limited prerequisite modules as constraints. Of the nine cases without exams, one was a postgraduate to whom the questions were not relevant, but eight would not have chosen a 100% exam module.

Where the course allowed more scope for module selection, it was of interest to see whether the presence of exams or group work affected module choice and whether selection was driven by interest, lecturer, or likely success. Where participants had the choice of modules, the sample size was 70. The assessment format had some impact on their module choice for 42 people, (see *App. 7.8*), of which 18 students indicated that format could influence them, but 24 said that they would still take a module for its content regardless of the type of assessment. Conversely, 26 said they were not influenced by assessment format and 25 of those confirmed they would take a module for its content regardless of the type of assessment. In total 15 students would have been put off by group work in a module, and six of these reported not doing modules because of the assessment format. When gender was considered, women were about 30% more likely to be influenced by the lecturer (see *App. 7.9-App. 7.11*). The figures for those who would take a module for both content and interest regardless of the assessment format or likely result (34) showed a higher percentage in men, indicating a deep approach. While 63 people would choose a module with 100% coursework, 33 would choose one with 100% exams (see *App. 7.8*). Two people preferred mixed assessment formats and would not choose either 100% course work or exams.

In summary, several factors influenced module selection, some of which were related to the mechanisms of study rather than content. Demands of 100% coursework versus the pressure of 100% exams meant assessment format was an issue for 60% of the sample; 45% would not do all exams but only 5% would avoid modules with all coursework. Group work was to be avoided for 20%. Men apparently took a deeper approach to learning, being more concerned with content than results. Women may have been more driven by performance success, but half the sample cited 'proving their ability' as a reason for doing the course.

Study Processes

This section considers the students' perceptions of study, the skills needed for HE study, the difficulties dyslexia might bring to these tasks, and the styles and strategies used to accommodate these (see *Section 8.2.3 – Study environment*).

The VARK data focussed on the presentation and recall of information. The data gained from the interviews covered aspects of study environment (space, light, and noise), social variables (teams and groups or alone), whilst some elements of the emotional variable were touched on by the Big-5 Personality Inventory. Statements from the WAY were analysed using NVIVO in relation to study to shed light on students’ views of themselves.

Perception of studying

Five of the WAY themes, or nodes, were grouped to form a set called ‘Study’. This covered 316 passages (parts of statements) made by 126 participants. Just two people made no responses that fell into this group, and 16 passages covered more than one theme. The greatest percentage of passages referred to the ‘Course node’ in the ‘Study’ set (see *App. 7.12*); within that set 25% concerned factual information, including year of study and subject. Dyslexia was the smallest node in this set (see *Table 7. 3*).

Node	WAY responses	frequency
Dyslexic		24
I am	dyslexic	15
	mildly dyslexic	1
	very dyslexic	1
	wanting a normal life	1
	heard of problems with nurses who have dyslexia	1
	having a few problems with my dyslexia	1
	confident that my dyslexia does not affect me to great extend.	1
	positive about my dyslexia	1
	delighted to discover my dyslexia	1
	dyslexic and proud of it	1
		24

Table 7. 3 Dyslexic WAY node response frequency

The nodes in the ‘Study Overview’ set were ‘Course’, ‘Dyslexic’, ‘Studying, support and strategies’, and ‘Time and organisation’ (see *App. 7.13-App. 7.15*). It was possible to analyse how many responses any participant made, and find the frequency of this level of response across the sample for this set (see *App. 7.16* and *App. 7.17*). Half the participants made between three and nine responses within the ‘Study’ node set.

Looking at another set that focused on Study Issues (‘Effort’, ‘Spelling’, ‘Struggle’, and aspects of ‘Stress and anxiety’), 165 different statements were found from 84 participants. Four statements were coded under two themes, which gave the total of 169 (see *App. 7.18*). Two thirds of the passages were evenly split between ‘Effort’ and ‘Stress and anxiety’, but spelling accounted for fewer than 5% of statements on study issues.

Of all the statements, 9% were related to the theme of effort, hard work and commitment. A couple of replies related to 'effort' in a negative way, implying 'not working hard', but it was not clear whether this was based on the result or actual effort. One student wrote of being 'bored at uni', 'lazy' and 'mentaly unstimulated (sic) by my work' (MQ18). 'Stress and anxiety' covered references to being under pressure, being busy and issues of confidence. 'Struggle' node included statements about speed of reading, organising thought for writing, and keeping up with the course (see *Section 8.2.1*).

Learning Styles

An awareness of the existence of types of learning styles, due to completing a measure like VARK, offers a student a more pro-active role in selecting their study strategies (see *Section 2.2.3*, *Section 3.3.2 – Learning Mode preferences* and *Appendix 3.4 h*).

The sample had their university and dyslexia in common, but over a quarter did not know about their dyslexia until after joining university. The delay in recognition suggested that there was not that much opportunity for commonality in their experience of study or dyslexia in anything but the most general terms. Non-dyslexic students were nearly 10% more likely to prefer using the mode of 'Read/write', whilst dyslexic students ('valley' profile) preferred Visual and Auditory solutions (see *Figure 6.10*). Dyslexic students in this study were found to be almost three times as likely to have not selected a 'Read/write' response for any question (see *Figure 6.12* for void modes details).

Support work during schooling might account for more distinct views on preference, as the learning modes were more likely to have been addressed explicitly. Being regularly exposed to working in a variety of modes may have increased the 'comfort' zone for some students. In total, 37 participants liked to use all four modes (see *App. 6.83*). Multi-modal learning mode preferences, shown by 57% of the sample (see *App. 7.19*), were not related to pre-university study skills support.

In contrast, the final VARK question related to how a student wanted their lecturer to present material (see *App. 7.20*). For this dyslexic sample, the greatest preference was 21% Read/write (textbook, handouts, and readings), which was seen as representing a reliable source for the topic whilst reducing the risk of misspelling key names or words. This was followed by 16% Kinaesthetic (field trips, labs, practical sessions), then Visual, then Auditory. The preference for 'Read/write' may be because students need lecture information to go into long-term memory for later use, which increases the need for

reliable and complete data. Notes are unlikely to be the only exposure to the topic; it will be 'taught' to some degree as well, making it more of a multi-modal situation.

Approaches and Strategies

A brief review of VARK preferences against Equipment or Support data was carried out, where possible, to look for potential relationships between modality and support strategies adopted. Students with auditory preferences might be expected to consider using software to listen to computer format handouts. Auditory preferences [VARK] and Handouts (H/o in appendices charts) in a computer format [Equipment] showed a negative correlation ($r = -.63$, $n=17$, $p<.01$) that accounted for 40% of the variance using Spearman rank correlation (see *App. 7.21*) and no significant use of text-to-speech software. Read/write preference showed a small negative correlation with finding *MS Office* helpful [Equipment] ($r = -.43$, $n=40$, $p<.01$). The Support Questionnaire showed a strong negative correlation between Kinaesthetic preferences and finding reading lists given in advance helpful, ($r = -.90$, $n=7$, $p<.01$), which accounted for 81% of the variance (see *App. 7.22*); however, the sample was very small. These three findings were not replicated when considered for the other measure (Equipment or Support), for any case.

For eight students, Read/write was the single mode preference in the VARK measure. It was strong or very strong in seven out of the eight, (see *App. 7.23*) of which five were female. These 'Readers' did not score high on Visual modality [VARK] and were mid-range for Kinaesthetic [VARK]. Only one described the library as 'most helpful' (see *App. 7.24*) [Support]. Of the keen users of Read/write, half were recommended scanners that were not deemed very helpful [Equipment] or possibly not used. The auditory learners did not show a positive relationship with a benefit from a scanner [Equipment] or using it to access text to be read by software [Support].

Summary of study processes

Considering students' perception of the benefit or purpose in studying in HE, friends and parents had only a small role to play in the decision to attend university, although wanting to 'prove-a-point' was a reason for attending university to which many people clearly related. Spelling skills were not specifically perceived as relating to the effort and stress that underpinned the study experience. Issues with working memory or processing speed capacity underpinned many of the skills' difficulties. Handling the uncertain impact of dyslexic stress sometimes led to a perfectionist approach, and some method of balancing the demands of effectiveness against effort appeared to be a useful study skill.

7.2.3 Support

Some students had no support for study skills or dyslexia prior to university (see *App. 7.25-App. 7.27* for age groups, for gender breakdown *App. 8.18* and *App. 8.19* using Dyslexia Background, and *App. 7.28* and *App. 8.15* for pre-HE Support data). Only for a relatively small section of the sample where interviews or comments were available was it possible to distinguish between those who apparently fell into Group C, unknown dyslexic. Some had no suspicion of problems, or accepted them as personal limitations. Other students had parents who did a great deal to support them unofficially, an important factor in the adjustment / accommodation process. Gender appeared to have a role in early recognition, potentially the result of behavioural response to frustration, criticism, or expectations of others.

There are two key sources of support, the HEI and the funding body (LEA, NHS), for students in HE, and *Section 7.2.1* (Identification to Registration) addressed some of the issues involved in getting support in place. Some support might also be available through hardship or access funding, grants from local dyslexia associations or as part of training for future dyslexia support tutors. Fellow dyslexics, siblings, and friends of dyslexics can provide a dyslexia aware social group and also some academic survival tips.

Delay and support

Identification of dyslexia assured only university based support; an application was needed for DSA support. A delay in both identification and then receiving support has major implications for future academic performance and outcomes.

The difference in previous support levels varied between age groups (see *App. 7.25-App. 7.27*). Those aged under-25 years on entry, compared to those 25 years and older, showed over 25% increase in previous support experience. Students who were older on entry were the majority group using individual support. The Learning Skills module was mostly used by the mature students (see *Section 8.2.3 – University support*). Women were more likely to have had no prior support (see *App. 7.28*).

In all, 51 participants were identified in primary school (see *App. 7.1* and *App. 7.2*) and of those 33 (65%) were apparently not using group or individual support at HE, including the Learning Skills module (see *App. 7.29*). The greatest numbers (15) using one-to-one

support were aged 18-24, and had been identified at university or in the three years preceding entry to the course. The second largest number using one-to-one was in the group identified during primary education (N=10) but that was the lowest percentage of a group (20%). All but two of this group reported having previous support.

Some mature students, coming from Access courses, had been made aware of dyslexia issues and had support, but did not have the benefit of well-developed longer-term study strategies and had not had experience of transferring them to new situations. Other mature students had more of a 'consumer attitude' to being a student and were well aware that time spent on 'learning to learn' would be of help with future professional development, but their schooling might have happened in an era that did not prepare them for this form of study.

Mature and returning students may have had little or no previous study support and been keen to take it up. Certainly, the older students were more likely to participate in this research, and most of them were contacted as a by-product of their support use. In several interviews, the feedback on support indicated that people had a self-reliant approach, but were prepared to accept support in a safety net role. M1 was a mature student who had had a support in the past who had:

'...decide[d] not to take advantage of any help in equipment or exam time, but would like to reserve the right to if necessary'.

M8 was a mature student identified at the RI while retraining for a career change who felt, having made it into HE, that what he was doing was already working:

'I've not used much of it but I've been very glad its there if I wanted to use it, if you understand. Something to fall back on if I need it.'

University support as experienced

Regardless of gender, the largest group only made contact with Support Services up to five times, the key reasons for contact were being screening, registering for support and DSA paperwork (see *Section 5.3* for details).

One student (M6) commented in his interview that 'the help was there and you just had to ask for it'. Another said:

'I requested IT support, however I got no response & assumed I wasn't eligible although I found out in the 3rd year I should have kept on pressing (like my friend had done) and I would have got the IT I needed. Not being keen to talk about it I'm sure I fell into not accesing (sic) things like possibly many other people.' (FQ4)

Even with the arrangements in place, they were not always enough, and inappropriate strategies for the format of task could still affect the outcome. A common issue was handling time pressure; for example:

‘to do exam essay ... I found these very hard in a time situation.’ (F8)

There were also issues of environment and format. One student F28 reported:

‘Although extra time in exams has been really usefull (sic), the conditions in the room were anything less than perfect at times. (1) one term the exam room was positioned next to a very noisy building works! (2) The room used has a weird lighting system that kept turning the lights off and although added a few extra minutes this did not make up for the inturptions (sic).’

Then there were format issues such as:

‘...two of my exams were 7 hours in duration on the BENG Civil Engineering, I didn’t receive an extra 25% of time and I didn’t feel that I was marked with due consideration.’
(MQ4)

Another student (FQ5) stated that they found:

‘...the multiple choice Ed Pack exam hard – to do written exams be easier for me.’

However even within the dyslexic community:

‘Having the same amount of extra time in exams as other dyslexics, I know sometimes I feel guilty as they seem to have a more severe case of it.’ (MQ5)

Receipt of dyslexia-aware-marking of assessments or exams required a blue card to be attached to the work (see *Appendix 7.1.3 – Dyslexia aware marking*). Between 70% and 80% of students considered the marking arrangement the most, or second most helpful, form of support. In contrast, the more compensated dyslexics were concerned that this put a ‘glass ceiling’ on their grades:

The blue cards that you attach to your work is looked at as poor work and when I did not put a blue card on my work, I always, got better grades.’ (FQ6)

And

‘The blue card system lowered grades of assignments generally. It was felt that they lowered the expectations of the work. It was found that I could achieve better grades without putting the card on. However I was achieving a first, so I can see how blue cards are helpful to students with grammer (sic) problems etc.’ (MQ6)

There were further points raised about staff understanding of the blue card marking:

‘Blue cards – these have twice been left on by tutors when my work has been returned allowing other students to see that I am dyslexic when I am not always ready to tell them.’ (FQ7)

DSA support – leavers

DSA funded support in the form of equipment and support tutoring, combined with university provisions for marking and exam arrangements, caused one participant to observe that:

‘...you get a lot of resentment from other students, ... other dyslexic student found the same.’ (F5)

While waiting for recognition and support, self-protection mechanisms can become habits: ‘You don’t write such long words because you can’t spell them.’ (F5)

Students’ concerns were reflected by the comments of F27 ‘I have had the misfortune to fall into a category that resulted in long delays in having my needs assessment completed’, which ‘left me no time to get familiar with the whole package. I am starting my third year’. Her summary was ‘So: delay is a BIG ISSUE’, as ‘I won’t have time to use them [recommended tools] in university’. A related comment from MQ11:

‘I still haven’t received the technical support I require for my course, this puts me at a disadvantage to my fellow students & will be reflected in my overall grades & it is also affecting my self esteem & feelings of self worth.’

Five students included thanks in their comments on the support at the RI, including MQ1 in an open question on support:

‘In my first academic year I did not have any of the indicated support as I was not aware of the support, my grades suffered, however this year I was lucky enough to be awarded a PC, Printer etc which has helped more than ever you could imagine. My average for this year so far is 80% much helped by my home set-up of facilities. Thank You’

Other students highlighted the delays and also the benefits of support and role models:

‘The [RI] team were very quick at getting study supported sorted out. It is the LEA’s, which causes problems. Overall, I was extremely happy and satisfied (sic) with the level of support I received.’ (FQ22)

‘Thank you so much for being so helpful and communicative – When I so often wasn’t. The Dyslexia department made studying at [RI] much easier than it could have been.’ (FQ2)

Potentially some of the students, previously denied recognition by the system, should have been keen to access support while it was available. Two reasons for avoiding support may also have ceased to apply in HE; firstly, the change in the study skills demanded by courses, as the level of study increases, means that there is perhaps less of a stigma associated with support; secondly, the semi-timetabled nature of university life makes it less intrusive. The following sections consider the impact of the DSA support.

The Recommendations – Equipment and Support

Some questions were repeated in both Equipment and Support Questionnaires. For a few students, those using Financial Aid or self-funding support, only one questionnaire was relevant. Comparing the questions repeated between Equipment and Support measures using Pearson correlation identified the following overlaps: MS Office [Equipment] and MS Office [Support] ($r=.71$, $n=74$, $p<.0005$); Text-to-speech [Equipment] and Text-to-

speech [Support] ($r=.73$, $n=50$, $p<.0005$); Mind-mapping [Equipment] and Mind-mapping [Support] ($r=.60$, $n=44$, $p<.0005$); Speech recognition [Equipment] and Speech recognition [Support] ($r=.97$, $n=17$, $p<.0005$).

Equipment

Many participants ranked a number of items equally (computer and printer in 34 cases), while others did not feel able to rank the helpfulness of equipment they had received at the point the questionnaire was received.

Not all participants indicated whether their *recommended computer* was a desktop or a laptop (see *Table 7.4*, *App. 7.30* and *7.31* for details).

Recommendation N = 128	Recommended no.	bought no.	used no.	most helpful	top 3 helpful
Computer	13 (12%)	12	10	91 (97%)	93 (99%)
Desktop	54 (48%)	49	49		
Laptop	46 (41%)	39	37		
Printer	96 (99%)	90	83	35 (41%)	77 (91%)
Scanner	82 (98%)	77	63	15 (24%)	40 (64%)
Internet connection	75 (95%)	65	51	19 (37%)	36 (69%)
Recorder	92 (100%)	82	66	16 (23%)	42 (60%)
Pocket spellchecker	81 (100%)	70	60	11 (18%)	38 (61%)
Organiser	23 (96%)	18	14	2 (14%)	5 (38%)
Quicktionary	16 (100%)	12	10	3 (27%)	6 (55%)

Table 7. 4 Equipment – recommendation, purchase and use [Equipment]

Of those with desktops, 49 of the 54 were already in use, while of those with laptops only 37 were definitely in use, five had not been ordered and a further four, although ordered, had not yet been used. It was not clear whether this was a matter of the timing of the questionnaire in relation to the assessment, debate with the funding body or failure to use the equipment. For those *recommended printers*, this was equal or second only in importance to their computer in terms of study and support (see *App. 7.32* and *App. 7.33*). In one instance, the printer was ranked the most helpful, followed by the scanner, recorder and finally the computer. The other two cases both ranked a recorder as the most helpful piece of equipment.

A *scanner* was recommended to or used by 84 people (see *App. 7.34* and *App. 7.35*). Of the 77 people who were recommended or were using an *internet connection* only 52 indicated its importance to their studies (see *App. 7.36* and *App. 7.37*). In 17 cases a scanner’s usefulness was rated jointly with a computer and printer.

Dictaphones and minidisks were grouped together as *recorders* (see App. 7.38 and App. 7.39). Sound quality seemed to have put a couple of students off recording lectures; they abandoned use of dictaphones, in particular, but also a minidisk. Two other issues with recording were; firstly, not finding time to listen to the recording, and so not having any written notes to work from, and secondly, being too embarrassed to record in lectures.

An *electronic organiser* was only recommended to 23 people and of the 14 rankings for this equipment, nine were not in the top three (see App. 7.42 and App. 7.43). For students *recommended a pocket spellchecker* see App. 7.40 and App. 7.41, and for comments on a *Quicktionary* (Scanning pen dictionary, with speech) see App. 7.44 and App. 7.45.

The need for back-up devices, or ways of transferring large files between a personal computer and the university network computers, was controversial, so the participants were asked whether they had *ever created a file that was too big for a single floppy disk*. The response size was 111, to which 49% (54) answered 'Yes' (see App. 7.46). Originally this revolved round the need for a CD-writer (now DVD or memory stick), but associated issues included the need for two way transfer of data, and security issues with memory sticks which had the re-writable characteristics. A quarter of the students replying reported that they had decided to upgrade the recommended specifications at their own cost.

Pearson correlation data from the Equipment Questionnaire indicated that if a student used technology, there were some significant positive relationships between printing, scanning, and recording being found helpful (see App. 7.47).

Software

Some students commented that software did not always support study. One of the issues here might have been a technical mismatch of specification; for instance, the speed of speech-to-text software caused one student to abandon it. Others students indicated that there might be a difference between items looking interesting in the assessment and their suitability for the study approach used for the course; for example:

'...when all computer equipment came, didn't know what some packages do' (F5)

and

'R&W [text-to-speech] not used, didn't use Franklin [pocket spellchecker] as computer had spellchecker,' (FQ6)

There were other students, who could easily have accommodated more equipment in their strategies:

‘[It] would have been useful to add additional equipment, ie scanners, mind-mapping software etc, this would have been very useful; especially a spell check’ (FQ8)

If TextHELP was installed for text-to-speech, VAT was not paid on the whole computer, since it is a disability specific package. This might have influenced the frequency of recommendation for this package; however, both measures showed this package in the top three for helpfulness in 80% of cases (see App. 7.58 and App. 7.59).

The ‘software’ question was repeated, along with an additional question on course related software, within the Support Questionnaire (see Table 7. 5 and Table 7. 6), in anticipation that not all participants would complete the Equipment Questionnaire. Software questions only had a possible maximum ranking of seven. This section, in both questionnaires, was completed by 115 participants. For details of the software findings see App. 7.48-App. 7.61 and App. 7.64-App. 7.69.

Recommendation	Recommended no.	bought no.	used no.	most helpful	top 3 helpful
MS Office	97 (98%)	90	83	73(90%)	80 (99%)
Speech recognition	40 (98%)	29	19	4 (19%)	12 (57%)
Text-to-speech	85 (97%)	75	59	16 (27%)	48 (80%)
Mind mapping	83 (98%)	75	55	12 (24%)	43 (84%)

Table 7. 5 Software – recommendation, purchase and use [Equipment]

Recommendation	used no.	most helpful	top 3 helpful
MS Office	93	66 (83%)	76 (95%)
Speech recognition	31	9 (38%)	18 (75%)
Text-to-speech	70	14 (25%)	46 (81%)
Mind mapping	68	16 (30%)	42 (78%)
Course related software	13	3 (33%)	8 (89%)

Table 7. 6 Software – recommendation, purchase and use [Support]

Data filter of DSA related responses in Equipment (N=128) was used for the following frequencies. *MS Office* was recommended, bought and or used in around 80% of the sample who completed the Equipment and Support Questionnaires (N128) (see App. 7.48-App. 7.51). For some people, dictation in the form of *speech recognition* software, rather than solely using the keyboard, was the best way to produce text, although this had its own planning demands; for instance, to avoid rambling. Speech recognition was recommended to between a quarter and one third of students, (see App. 7.52-App. 7.55). Speech recognition was the most likely package to be recommended inappropriately.

Text-to-speech software has two potential uses; firstly for listening to reference material on a computer (scanned or internet), and secondly, for proof reading. This package was recommended to between over half [Support] and two thirds of the respondents [Equipment] (see *App. 7.56-App. 7.59*). When subsequently asked about usage, 51 responded, 42 (82%) people reporting that they used it for proof reading, only three (6%) for reading articles, whilst five (10%) used it for both types of reading (see *App. 7.60*) and 34% used the homophone checker (see *App. 7.61*). From other questions, it appeared that only the basic level of functionality was being used in the text-to-speech package. The two students who were recommended both speech related packages ranked them both bottom of their lists.

In the Support Questionnaire, 71 participants gave feedback on their *scanner usage*; 34 people used a scanner for text and 50 for images and diagrams (see *App. 7.62* and *App. 7.63*, *App. 7.34* and *App. 7.35*), and 13 for both (see above for Equipment recommendation figures). In this questionnaire, a greater percentage reported using text-to-speech for both types of task rather than just proof reading. This suggests that between eight and 15 people actually made some use of text-to-speech for articles that had possibly been scanned.

The *recommendation of mind-mapping software* covered 53% of the Support respondents, 66% of Equipment respondents – a similar level to text-to-speech (see *App. 7.64-App. 7.67*). In a few cases (18) *course-related software* (*AutoCAD*, *Visual Studio* or *Sibelius*, etc) was recommended (see *App. 7.68* and *App. 7.69*), probably in light of a dyslexia-based need for a personalised PC set-up and environment. All but one put it in their top three helpful pieces of software in conjunction with *MS Office* and another package.

When the helpful rating was considered for both questionnaires to see how many ranked items appeared in the top-four, a personal computer and *MS Office* were very nearly always rated the most important support (see *App. 7.70* and *App. 7.71*). Quite often, this was in conjunction with other recommendations, for which some students ordered their responses and others ranked them. In most cases, at least 80% of recommendations were placed in the top four for usefulness. Equipment (not only a computer) was less helpful in more cases than support arrangements or software recommendations. Up to 44% of participants thought they had been recommended too much (see *Section 7.3.3*).

There were limitations to what could be concluded from the data, in that it was only possible to consider what was recommended, so omission from recommendations was not addressed. Over a third who answered actually upgraded the equipment they had been recommended in some way. Speech recognition was the most unsatisfactory package, but that might relate to training as much as appropriateness. Of the portable electronic gadgets the pocket spellchecker (81 recommended) was most helpful and an organiser least (24 recommended) (see *App. 7.40* and *App. 7.42*).

Training

The reasons for failing to use support or training included availability and timing. Some courses, such as healthcare, which had weekly placements, resulted in students wanting evening or weekend slots. Others did not realise the merit of using training in the first year, and then having the summer to familiarise themselves with the equipment before the pressure of the second year.

‘The leap from 1st to 2nd year was a lot bigger than expected, No-one really gave us any warning on how marking would change, even though I worked much harder I wasn’t employing the correct exam strategies’ (FQ23)

Other students may have achieved a ‘working’ level of competence with the technology over a holiday, when funding for support was difficult to get, or were not feel able to assimilate training while undertaking coursework.

The equipment and software recommended needed setting up and, in some cases, instruction, before inclusion in study support could be considered. It was reported by 60 students that they were recommended *technical set-up support*, of whom 41 used it (see *App. 7.74* and *App. 7.75*). Of the 39 people who answered the question ‘*Was the computer set-up session helpful?*’ 26 (67%) of those rated it ‘most helpful’, and only one rated it ‘totally unhelpful’, having accepted it to ensure her warranty. Two students commented that pace of the training was too quick and that demonstrations in which they did not control the mouse themselves were not helpful. Twice as many had been recommended the university based IT support as assessment centre or external trainers. Use of training from the trainers or from RI support tutors had a low take-up rate of 50%.

Small numbers of participants reported that *training in the specific software* was recommended; where it was taken up, between 40 and 50% rated it ‘most helpful’ (see *App. 7.76–App. 7.79*). Uncertainty over report content, in terms of either eligibility or

availability, might have distorted self-reports of training. Greater benefit might have been derived from Text-to-speech packages with training including incorporation into study strategies, especially where the student had to overcome an aversion to reviewing work. Complex packages such as speech-to-text by voice recognition were recommended to 41 people, of whom 24 commented on how helpful they found it, yet only five reported on the usefulness of training. The speech recognition software was deemed helpful by the lowest percentage of recipients; the reasons for could be that: the recommendation did not suit the study tasks; the lack of training prevented it being useful; there was failure to get beyond the basic functions.

One heart felt comment was:

‘[I] found it overwhelming when all computer equipment came, didn’t know what some packages do. Think computer support should perhaps come before the equipment – to make sure people use everything’. (F5)

Two aspects of equipment and software related training arose; firstly that of learning to use the software and hardware, and secondly, the problem of incorporating this into study strategies. As students put it:

‘I was not given any IT training and I am not confident on the equipment’ (FQ12).

Finally

‘I would like to learn how to use my equipment more efficiently but just don’t have the time so make do.’ (FQ24)

Asked, in the Support Questionnaire, whether they would have used *group IT sessions* had they been available, 65 responded ‘Yes’ (44%) (see App. 7.80). When specifically asked whether they would have used *dyslexia friendly word processing sessions*, 73 people were definite ‘Yes’, one ‘possibly’, and 52 said ‘No’ (see App. 7.81). When asked whether they were able to get the training they needed to use the equipment and software (N=84), 42% answered ‘No’ (see App. 7.82). To the question *have you abandoned* something that was recommended (N=97), 34% said ‘Yes’, and in response to *can you now make good use of your equipment in your studies* (N=101), 86% said ‘yes’ (see App. 7.83 and App. 7.84)

Summary of equipment support

The process of Needs Assessment and equipment delivery can be drawn out, and happens at a time when university life is raising new situations with which to cope. It was not surprising to find that two students indicated that they had little idea of what a software package had to offer, certainly no idea why it was recommended, or in what way it could

help. Even when something was identified as useful, training was not always effective when given as a one-off session for dyslexics; as one student said:

‘I would like some top up sessions on my IT because I easily forget how to use some of the useful things.’ (FQ9).

Pearson correlations for Equipment data on helpfulness indicated that if a student used the technology, then significant positive relationships could be expected between printing, scanning, internet, recording, and using a computer with *MS Office* (see App. 7.47, and App. 7.72 and App. 7.73).

Support arrangements – HEI / DSA

Aspects of support considered concerned the university as well as the DSA (see Section 2.5.1). The DSA did not have to be in place for support to begin.

The Support Questionnaire included an expanded version of the Equipment question on ‘study support’ covering library and printing arrangements, as well as offering verification of reliability of the input. Students had to pay for their printing from the university computer network and registered dyslexic students were allowed 200 half-price pages. The library arrangements included priority reservations and extra books.

The numbers responding to questions about the recommendation of and use of *dyslexia aware marking arrangements*, and how helpful they found it, varied between the two questionnaires (see App. 7.71 for other Support overview and App. 7.85-App. 7.90). On average, over half the populations using the marking arrangement ranked it as the ‘most helpful’ form of study support. One business student did not rate this as important, giving it a rank position of eighth (FQ10). This student treated the ranking as a scale and indicated that *exam arrangements* were the most important support.

Registration for dyslexia-aware exam arrangements data existed for 607 of the Leavers (see App. 7.91), including 10 who ‘opted out’ of using the arrangement although registered as dyslexic with Student Services. Participants were asked in three questionnaires whether there were exams on their courses, and 193 answered that there were, at least once (see App. 7.92). Departments such as Education and some art courses were known not to have exams or class tests. From 156 responses in total, 17 people (11%) explicitly said their course did not involve exams [Support]. Nearly 64% thought exam arrangements were, singularly or jointly, the most important form of support for their studies, as distinct from

equipment (see *App. 7.93*). By the end of the first year of study 79% of exam arrangements were in place (see *App. 7.94*).

An increasing number of students also need to work due to the changes in student funding. Working might have affected students' willingness to use study skills support or learn new technology because of conflicting demands on their time. There were 24 positive statements about Support in the open question responses. Comments included issues of time constraints:

'Nursing degree timetable combined with ward placement times make Study skills and support sessions VERY difficult to attend'; (FQ11)

and:

'I have not had time to follow recommendations' (MQ7).

A mature student felt he was studying the theory of the engineering which he had 'done' all his life and so did not need support.

'Just at the moment I have decided not to take advantage of any help in equipment or exam time, but would like to reserve the right to if necessary for the future' (M8)

Other negative feedback on support included difficulties with the less common study patterns: for instance, for remote or distance learning students there were problems with accessing support while off campus, as there were for those sponsored by their employer. Not all students were happy that they understood either their Educational Psychologist report or what dyslexia meant for them in their studies.

A couple of students indicated they were planning to use one-to-one support for their dissertation and another said:

'After my first year I have realised that I need to make the most of the help that will be given to me i.e. one-to-one support' (MQ8).

There were three references to third or final year students, who were battling with setting up support arrangements, and others about not being aware of the support available.

The questionnaire on support seemed to have triggered several people to investigate the possibilities of having handouts or reading lists in advance. Data [Equipment] indicated that during their assessment it had been agreed that *handouts in advance* would be helpful for 44 people, of which 20 reported that even though it was recommended, it had not happened (see *App. 7.95* and *App. 7.96*). Feedback on the benefits of this accommodation was reported by 26 people, of whom 16 put *handouts in advance* in their top-two support

tools. Advice to get their *handouts in computer format*, so that the layout and presentation could be modified or the contents listened to, was given to 43 people as a means to improve access to the material; 24 of 35 (68%) ranked it in their top-two support tools. The Support Inventory showed that 38 people were using computer format handouts and of the 35 that ranked its importance, 15 (43%) said it was 'most helpful'.

Reading lists were sometimes recommended, either to allow longer for pre-reading to develop a framework of understanding, or to reduce suggested reading to the essential texts. While 23 people were recommended reading lists, only nine provided feedback [Equipment], but three rated it 'most helpful' (see App. 7.97).

The *library arrangements* allowed priority and advanced booking of short-term loan books and a greater number of books at any time to reduce the need to skim / scan text before deciding which to take out. This was used by 98 people, and 87 ranked its relevance, with 29 (33.3%) calling it 'most helpful' (see App. 7.98 and App. 7.99). The role of the library in dyslexia support was full of contradictions. The library offered the ability to take out 15 books instead of 10, and the ability to plan ahead when booking short term loan books, including the overnight slots and weekend slots. They also facilitated a photocopying allowance. Although helpful, these arrangements also brought their own issues relating to organisation and time-management; for instance avoiding library fines and not drowning in a sea of information. One student talked of:

'...lack of time, reading 1/2 speed – busy comprehensive course – no more hours, vast library/internet wide choice makes it worse.' (M8)

While one student was 'terrified using library' (F19), another was planning to do a lot of work in the library, saying that:

'...trying to start my dissertation I really need a laptop to take back and forth to the library' (F30)

There were a number of comments relating to problems with the library computer systems and the special arrangements:

'Library services – I'm a very slow reader, therefore short loan books are hard for me to cope with. I would find it more helpful if i) I could renew over the phone and ii) I could borrow them for 48h instead of 24 hrs.' (FQ7)

Computer network *printing allowance* use was acknowledged by 106 people (see App. 7.100 and App. 7.101). It was rated by 97 of these, with 44 giving it a 'most helpful' ranking, either on its own or in conjunction with other provision.

Support in groups

At the time of the research, Group Study Skills sessions were offered by the university. There was also a Learning Skills module for dyslexic students (see *Section 2.5.1*). Students that had their Needs Assessment reports were occasionally recommended these sessions, where knowledge of provision existed. Groups offered discussion and time to process information, being less intense than individual support.

For some people it was not clear how to access support:

‘I would like to have attended group study sessions and 1-2-1 support I just didn't know how to sort it out.’ (MQ9)

One student found:

‘I was unable to attend any help groups as the course I am working through is 5 days a week and clashed with the study times.’ (gender unknown Q1)

Another said:

‘I have not had time to attend drop in session due to constant timetable clashes’. (FQ20)

There were 47 people [Equipment] who were recommended and, or used *group support*, of which 22 gave a ranking, 13 (59%) placing group support in the top three (see *App. 7.102* and *App. 7.103*). Data from the Support Questionnaire (N=34) was then used (see *App. 7.104* and *App. 7.105*), because the Learning Skills module questions were included, allowing a review of usage of multiple support modes (see *Table 7. 7*). In all 19 people were using multiple support types including groups (see *App. 7.106*), of which two were not accessing the DSAs for individual support.

Used Group Support [Support]	
Groups only	15
Groups and one-to-one only	11
Groups and module only	2
All 3 (groups, module, one-to-one)	6
Total	34

Table 7. 7 Group support – multiple support usage [Support]

For those who used or were recommended group support, the sample size was 93, with 56% being female, 80% in full-time study, (see *App. 7.104*, *App. 7.107* and *App. 7.108*) being most likely to be in research Group B (49%) followed by C (33%) (see *App. 7.19*). One quarter were aged 30 and over, at the start of the course (see *App. 7.110*), which was 10% higher than the figure for those using DSA in general. It was suggested that:

‘There should be more drop-in sessions and more study skills lessons.’ (MQ10)

A Learning Skills module (M0506) was available at the RI specifically for dyslexic students, although not everyone was aware of it and 70% of those who were could not fit it into their timetable (see *App. 7.111-App. 7.114*). Where, either measure showed, the module was taken the sample size was 109 (see *App. 7.115-App. 7.118*). The sample size for cases where either of the support measures showed that the module was taken was 109. Of these, the course structure for 94 students was full time, for at least part of their course, of which 17 had placements as part of sandwich courses study (see *App. 7.115*).

Looking specifically at those who did the Learning Skills modules, 62 were female, 47 male, with over a quarter in the 30+ age group (see *App. 7.116* and *App. 7.117*). Three students had contacted the university dyslexia support team in advance (Group A), but 32 (36%) did not know they were dyslexic according to their research group (see *App. 7.118*).

Individual support

Looking at personal support, the two questionnaires [Support and Equipment] showed 44 and 60 responses respectively in relation to *recommendation and use of one-to-one support*. At the time of the study, 26 (43%) of the Equipment participants, advised to use one-to-one support sessions had not taken this up (see *App. 7.119*). The significance of this form of study support was ranked by 32 people, 13 (41%) saying it was the 'most helpful', although six people placed it fourth or lower on their list (see *App. 7.120*). On the Support Questionnaire, 44 students used it and 36 commented on its usefulness with 17 (42%) ranking it 'most helpful' while 10 put it outside their top-three (see *App. 7.121* and *App. 7.122*). Regardless of type of questionnaire, over 40% of the two samples rated this as one of the 'most helpful' forms of support.

Data were available for students from the measures and historic Leavers' data for those who used individual support (N=366), regarding age group when identified (N=348) and study format (N=364). Over 80% were in the under-30 age group at the start of their course. Full-time study was the norm for this group (332 students or 97%) of which 39 students (11%) were undertaking sandwich courses (see *App. 7.123-App. 7.126*). There were 90 students (25%) who did not know that they were dyslexic when they started at university (Group C), while 20 (6%) were Group A, who pre-contacted the support team.

There were five recommendations of *maths related dyslexia support*. Only three students gave feedback, two reporting that it was 'most helpful'. From support tutor meetings it

was apparent seen that there was a greater need for maths related support than this suggested and that it was very hard to resource.

‘I was too stressed last term to take on recommendations of my 1:1 study support ... have suspended our sessions’.
(FQ13)

One student reported that one-to-one support had become unnecessary and another said that their school support had been so good that:

‘I feel that I knew how to manage my dyslexia and don’t feel I need any extra support other than exam arrangements’.
(FQ14)

Direct reference was also made to the dyslexia support department’s ‘great reputation and understanding’, this being given as the reason for studying at the institution after dyslexia was identified during A-levels.

Summary of Support

For 97 % of the sample, a computer was ranked the most helpful piece of equipment, followed by a printer. For between 83% and 90% the *MS Office* software package was regarded as most helpful. The data suggested that laptops took longer to be provided in terms of both assessment and use. One reason might have been that funding bodies were less willing to authorise them. Another, might have been that starting to incorporate the use of the laptop into study and classes took planning, because of problems with power supplies and safe storage. Recommendations about handouts or reading lists in advance were also not always easily implemented. Some of the able students reported finding blue cards for dyslexia-aware marking had a ceiling affect on grades, but it was a highly ranked support mechanism for the dyslexic population in general.

Of the whole study population, between 13% and 15% (some cases just listed as over-25 years) were over the age of 30, with one student reporting being aware of having dyslexia for 30 years and a further two for over 20. Data from the Support Questionnaire and Leavers records revealed that students over 30 years were most frequently in the group doing the Learning Skills module, with a fifth attending the drop-in group session and a quarter using one-to-one support.

7.3 Outcomes

Outcome information came in two forms, the completion codes for participants with Leavers’ data (N=135) indicating successful completion, time out or academic failure, etc. The second source was from PIP pages (N=202); if the course was completed, degree class and completion date were available, otherwise the data consisted of individual module

results and field averages. PIP information was available for 111 females and 91 males, covering 4254 modules. The data showed 174 course awards, including nine in postgraduate studies and six diplomas. The use of outcome data (module and degree results from PIP data) enabled analysis of the success of members of each research group.

In the RI, first year modules did not contribute to the final class of degree, but nevertheless needed to be passed. The first year represented the best time to establish which strategies were appropriate for a student and course. Once dyslexia was identified, there was an issue about its impact on existing results, although the regulations from 1994 were clear that there could be no retrospective changes. One student found delays had ramifications for their course outcome. The comment was made in an open question:

‘I questioned about weather (sic) or not my grades (past papers and exams) could be re-looked at & marked using the “Blue Card” the response was very negative and I was basically told that it would be too much hassal (sic)!’ (FQ3)

Information about the impact of support on grades and outcome was available where Support Questionnaire or interviews were completed and PIP data was present.

7.3.1 Degree Class of Award and Module Results

The Leavers’ data showed 80% of the students as academically completing ‘OK’ (see *App. 7.127*), with 6% failing, 7-8% abandoning studies in particular because of ‘time lapsed’ and 3% finding the course or college was not right for them. Of the PIP records, 188 provided course information, but not always award data. The most frequently occurring degrees achieved were in Hotel and Restaurant Management, followed by Occupational Therapy (see *App. 7.128* for top 17 Fields). Another approach adopted in the analysis was to tally modules with a specific field association. Considering the 4254 modules marked as taken or timetabled in PIP data, 3486 had a field code. This code showed Combined Studies in addition to those from the course data (see *App. 7.129*). Anthropology modules were taken more frequently than the course figures suggested.

An analysis of PIP with Course Type data indicated that 38% of students were awarded a BA, 47% BSc, and 5% BEng and postgraduate awards; the remainder studied theology or diplomas (see *App. 7.130*). Analysing PIP with ‘Award Class’ gave a sample of 174, with a total of 91% degree passes (see *App. 7.131*), the remainder including diplomas and postgraduate awards. The awards included 40% Upper Seconds, 35% Lower Seconds and 5% Firsts. There were 16 cases where the degrees did not include the dissertation needed

for an honours degree and one student failed (.6%) according to PIP. Leaver’s data showed a further four cases with incomplete PIP Award Class data, which were either classed as ‘Academic fail’ or ‘time lapsed’.

In a further analysis, the sample was restricted to degree results for comparison with HESA data (all students). This was a comparison of an extended period against one year’s HESA data for a specific year comparison (see *Section 5.2.4 – Outcomes*). The PIP data for undergraduate students (N=158) included nine Firsts in total. There were half as many Firsts amongst the dyslexic sample of this study compared to the HESA data for 2004/05 (see *App. 7.132* and *Figure 7. 2*). The presence of Upper Seconds corresponded closely and the study had nearly a fifth more Lower Seconds. Third Class degrees and passes were twice as likely in dyslexic students.

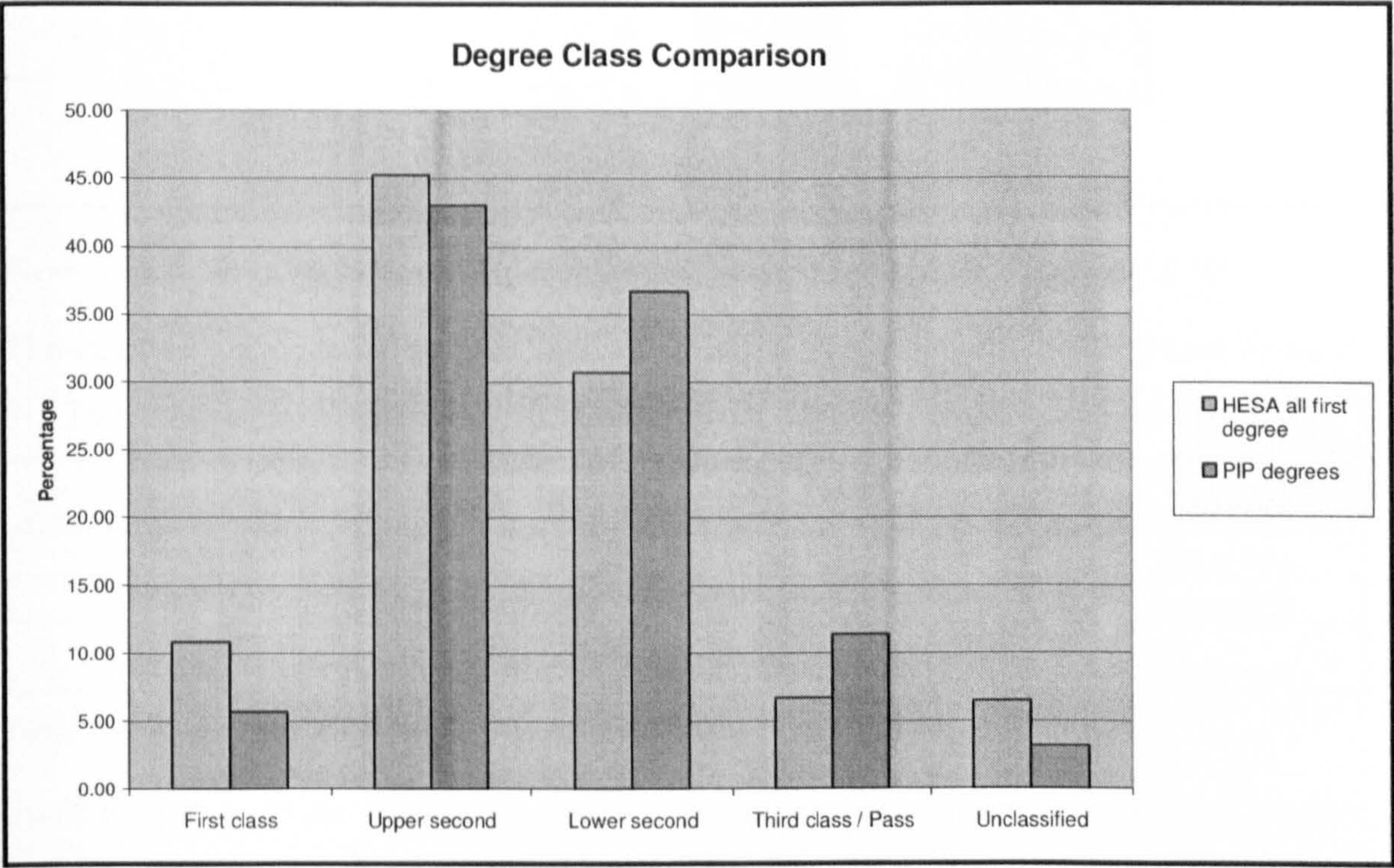


Figure 7. 2 Undergraduate degree award classes HESA v. RI dyslexic [PIP]

The PIP degree data showed nine cases with no indications of support having been used, 149 using initial support (including exam arrangements/ initial registration) and dyslexia arrangements (marking and exams)) including 71 additionally using key support (Group session, Learning Skill module or individual support). A higher percentage of RI students using support achieved Lower Seconds than in the HESA data (see *App. 7.133*). The highest percentage of support use at RI was seen in the Upper Second class of degree group (see *Figure 7. 3*, *App. 7.134*, *App7.135* and *App. 7.141*). There was no access to

students’ who failed their course without trying support. The gender split for students using key support was 50 female to 21 male, with age-identified known for 44 students, 76% of which were under-25 years when recognised.

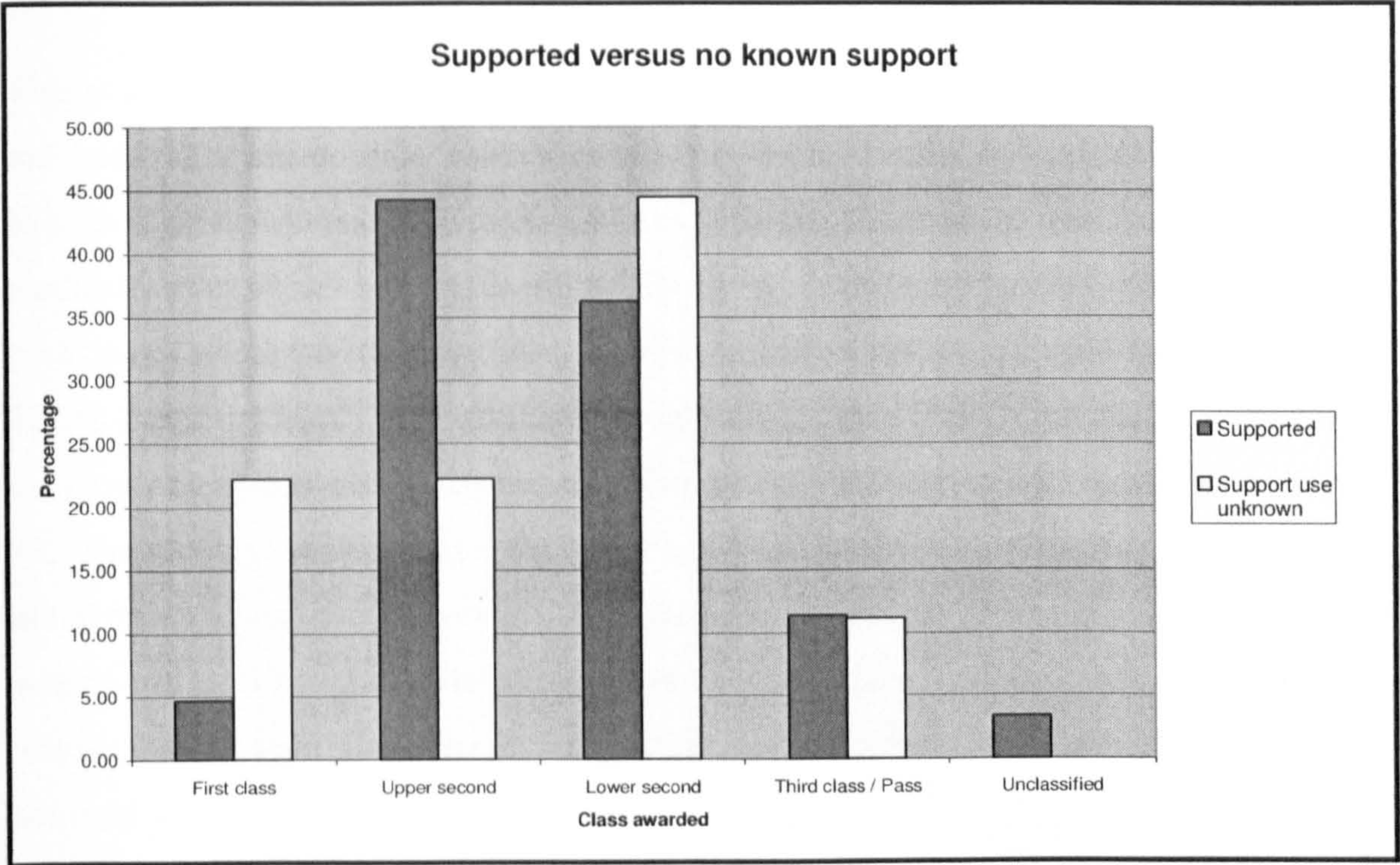


Figure 7. 3 Degree award classes for supported and unsupported dyslexic RI students [PIP]

The frequency of degree type and class was considered by support type used (see Table 7. 8). The Learning Skills module (M0506) attracted a higher percentage of BSc students.

Support		BA	BSc	BEng	First	Upper 2nd	Lower 2nd	Third / Pass	Mode for Ave module mark
	Group	16	16	1	1	18	10	4	upper 50's
	M0506	9	13	0	1	10	8	3	upper 50's
	One-to-one	21	21	1	0	20	19	5	upper 50's

Table 7. 8 Degree type and class by support used [PIP]

Students who were identified at primary school and supported there, regardless of support in HE, produced the only First Class honours degrees of those identified during schooling and who had support prior to HE (see App. 7.136). There were no records found of these students using support in HE. Students whose dyslexia was recognised before 16 years of age had the highest percentage of Upper Seconds (73%). Those completing a degree without honours were mostly recognised as dyslexic after schooling ended (86%). These figures clearly support the case for the benefits of early recognition.

Of the eight students with a single mode Read/write Learning Mode preference, there were three Lower Second Honours and two Ordinary degrees; only one participant failed to

complete their course, due to personal reasons. It is worth noting that the remaining pair were awarded First Class Honours degrees, both male, one of whom used no key support and the other had completed the Learning Skills module.

This process of analysis was repeated for module results. The Module Grades data indicated the marks or information about failure of a module (see *App. 7.137-App. 7.139*). Module Grades included 85% module passes, a further 5% were the results of re-sits (not medically related) and 6% were outright failures. The Average Module Score for each participant, which was usually based on the results of 15 modules, ranged from 40% to 72.5% (see *App. 7.140*). The Average Module Scores were also grouped into ranges for the purposes of analysis, mostly covering five marks and working up from a pass mark of 40. The Average Module Score groups included 152 people known to have used either initial or initial and key support (see *App. 7.138* for impact of types of key support). The support use for 17 students was unknown, but a few of these, not apparently using support, were achieving very high averages, suggesting they were correct in their view that they did not need support.

7.3.2 Data by Research Groups

The data was reviewed for cases within each research group (A, B, C, D – see *Table 7. 9*) with a breakdown of cases with PIP data, filtered for PIP data, regardless of course or completion.

Research-code – dyslexia Identification code	SPSS		PIP	
	No.	Percent	No.	Percent
A - knew dyslexic before university & pre-contact HEI	78	4.50	18	9.18
B - knew dyslexic & contact support team on arrival (Yr1 Term1)	531	30.90	97	49.49
C- did not know Dyslexic before university	340	19.80	51	26.02
D - knew dyslexic, contact during course	265	15.40	22	11.22
Total	1214		188	95.92
Registered - no group information	122	7.10)	
Shadow status *	297	17.30)8	4.08
unknown status or group	86	5.00)	
Total	1719	100.00	196	100.00

Note: *‘Shadow’ – known to Student Services but not registered as dyslexic officially

Table 7. 9 Research groups [All SPSS]

The total number of cases with PIP data flagged as using support (from Leavers’ records or Support Questionnaires) numbered 114. The total using support and on a degree course was 166 (see *Section 8.4.1*).

In Group A, there were 26 females and 52 males; 63% were under-21 years old, with 68% taking a full-time course and 24% a sandwich course (see *App. 7.142-App. 7.144*). In this group, 18 had PIP data and 16 had completed (see *App. 7.145* and *App. 7.146*). There were 10 with BScs and six with BAs. There were two First Class degrees, seven Upper Seconds and five Lower Seconds. Leavers' data showed 34 completed 'OK' and no 'Academic failures'.

There were 531 people in research Group B, 254 females and 277 males, and 68% were under-21 years. Available data indicated that (N=474) 84% were studying full-time and a further 11% were on sandwich courses (see *App. 7.147* and *App. 7.148*). Details of awards were available for 87 people and included four postgraduates, and 81 undergraduates, five of whom had obtained Firsts (see *App. 7.149* and *App. 7.150*). There were a similar number of Upper and Lower Seconds (36, 33). The degrees included 42 BScs, 31 BAs and 8 BEngs. Group B were the strongest group, showing good results, with a total of 47% getting Upper Seconds and Firsts. Leaver's data showed 315 completed 'OK' and 21 'Academic failures'.

Group C numbered 340 people, 201 female, with 45% under-21 years old and 81% in full-time courses (see *App. 7.151* and *App. 7.152*). PIP course data for 44 cases were available; 18 were BAs and 20 were BSc (see *App. 7.153* and *App. 7.154*). In 43 cases with award class data, Group C had one First and 20 Upper Seconds, but only 12 Lower Seconds. Leavers' data showed 207 completed 'OK' and eight 'Academic failures'.

Group D in some form delayed contacting the support team, although aware of their dyslexia. The group numbered 265 of which nearly two thirds were male, and 67% under-21 years, with 73% on a full-time course (see *App. 7.155-App. 7.158*). Of 204 with a leaving code, 172 completed 'OK' and 15 had 'Academic fail', the highest percentage of any group (7.4%). Of the 20 awards made and shown in PIP, 10 were BSc and eight BAs courses. Very few award classes were known: they included one First, and more Lower Seconds (eight) than Uppers (five). This group had the highest percentage of Ordinary degrees (15%) compared to Honours degrees or postgraduate awards.

Figure 7. 4 shows the results by research group restricted to those who took a course that led to a degree (N= 196). Some of these students did not have an established research

group. Most award classes relate to honours degrees with dissertation or equivalent. An award class of ‘Degree’ was a non-honours degree.

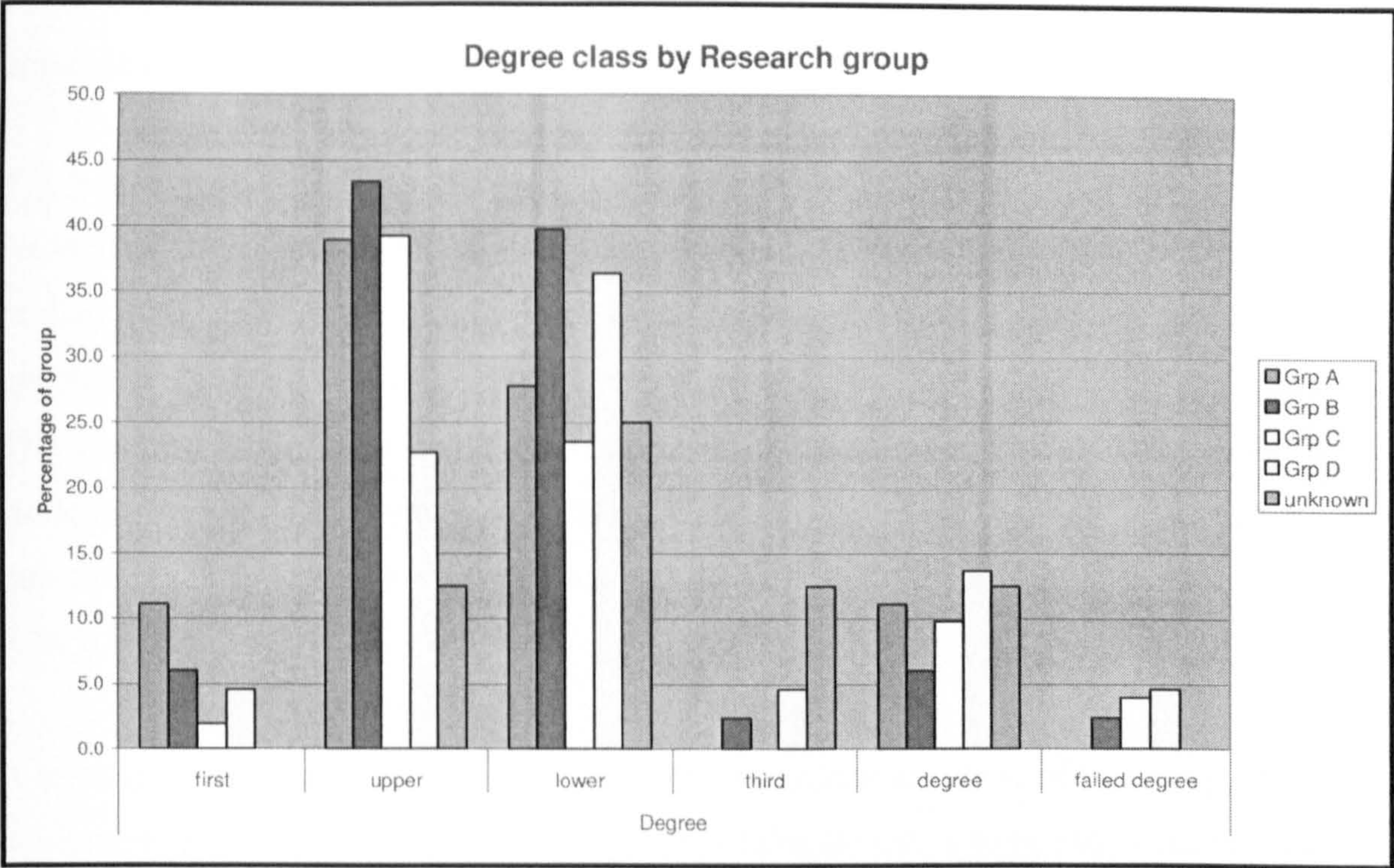


Figure 7. 4 Degree award class, by research group [PIP]

Group A, who made pre-contact, were all on degree courses. Group B included postgraduate students, and showed similar numbers of Upper and Lower Seconds. Group C, those who did not know of their dyslexia on commencing study, included two postgraduate awards and noticeably more Upper Seconds than lower degrees. The one official ‘fail’ was in Group C, but when Leaving code, from the historic data, was included, it was found that a second student had failed, being awarded a certificate for modules passed. A further ‘Academic fail’ had no award at all in PIP, and fell in research Group B. Another student with a ‘time lapsed’ Leaving code, but excluded from the sample because of the absence of an award class, was from Group B. The final group, D, who did not acknowledge their dyslexia until later in their courses, showed more Lower Seconds (see App. 7.158) and included another student with a Leaving code of ‘Academic fail’.

Research Group A tended to be younger and to use individual support (where used at all). This suggests that the need for on-going one-to-one support might be the drive for pre-course contact with the support team. Those who had recognised their dyslexia but did not feel the need for pre-contact (Group B) were more likely to be older and use individual, group and the support module. This group included the two First Class awards to dyslexic

students using support, and three who succeeded without. Other students awarded Firsts only used the university's arrangements for exams and marking. Those identified at university (Group C) covered a wide age range, and used all three types of support plus the university arrangements for exams and marking.

7.3.3 Feedback – Support Outcomes

As well as course results, this research considered the outcome of support. Of those who replied to the question about how much of the recommended equipment had been purchased (N=118), 80% (92) ordered everything (see App. 7.159-App. 7.163 for details). The *ordering process* was found to be 'stressful' on a four-point scale by 10 of 109 (9%) students receiving DSA (see App. 7.164). Of 106 people responding to equipment supply questions, nearly 18% (19) reported that *equipment that didn't work on arrival* (see App. 7.165).

It seems that students were making what they perceived as good use of those support and equipment recommendations, which they had not abandoned. Out of 105 students, 46 (44%) felt that *too many things had been recommended* for them to use as support, although almost 87% (93 of 107) said that they could *make good use of the equipment* that was recommended for use in their studies (see App. 7.166 and App. 7.167). In view of the low amount of technology training undertaken, these perceptions related to potentially naive expectations of software. Out of 101 responses, 35 acknowledged that they had abandoned some of the recommended tools and strategies (see App. 7.168).

IT support issues ranged from problems for the truly novice user, including the speed of and quantity of information during set-up or training, to the expert user being required to have a set-up session. One student was:

'...forced to have the on-site assembly by the company who said it would invalidate my warranty otherwise' (F9)

and then found that she still had software to install later. The speech recognition software gave least benefit and showed apparently low use of the recommended training, which such software would justify.

Considering personal support, 38 people [Support], when asked directly, indicated that they had used one-to-one provision, and 45 had not (see App. 7. 169). The timing of starting individual support was reported by 41 people. The date of starting support showed a spread over the three years of a course with a relative peak in the second term of the first

year and to a lesser extent of the second year as well (see App. 7. 170, and App. 7.4-App. 7.5 for details of registering with Student Services).

Questioned whether *one-to-one support started soon enough*, 31 people responded (see App. 7. 171). Those who had felt able to comment on this were nearly all participants who would have liked support sooner to some degree. People were also asked about the amount of support_time received, to which there were 33 responses (see App. 7.172). The options were '*much more*' time was needed, a '*few more*' hours, '*bit less*' would have been alright and '*fine*'. Most people would have found more support useful.

Asked whether they felt *dyslexia had not affected their grades* at university [Support], 149 responded (see App. 7.173). Around 40% still felt dyslexia had had an impact on their grades at university. Not only did dyslexic difficulties have the potential to interfere with studies, but it also affected the associated administration. The nature of the modular course created particular issues with structuring the course, both in planning and registering within deadlines. The Support Questionnaire investigated the number of people who felt that they had had problems with this aspect of university life (see App. 7.174). Only 7 % of those who responded felt that dyslexia had interfered '*a lot*' with the administration aspects of their courses, but 13% felt that administration issues had affected their grades (see App. 7.175).

Participants were asked about the *impact of individual support on grades*, 29 (50%) agreed that it helped (see App. 7.176 for Benefits of support). Subsequently, they were asked whether group support helped with grades [Support] (see App. 7.177). Of the 63 who reported on *using group support sessions*, 26 (41%) felt that it had helped their grades. All Support participants were asked whether they *would have used drop-in support sessions*, and 75% responded positively (see App. 7.178).

7.3.4 Summary of Outcomes

Academic outcome details were restricted to 'OK' in 913 cases, of which 728 could be attributed to research groups. Degree 'Award class' was available for a much smaller sample and reflected other data suggesting that dyslexic students averaged one class lower than HE students as a whole. The percentage of Lower Second class degrees being awarded out numbered those for the total HE population (see Figure 7. 2). Use of support was greatest amongst students achieving an Upper Second. Group D, who had not fully

accommodated their dyslexia before HE and delayed use of support, showed that these factors were probably detrimental to their results.

7.4 Summary

This chapter has addressed the students' experience of learning situations, and their outcomes in relation to support. On-going issues, which emerged from the analysis, included not being aware of the support that was available or how to access it, and lack of appropriate IT support. Some students within research Group D appeared to have misjudged the need for support and in some cases left it too late for it to be effective. Certain courses such as healthcare, where work experience was part of the course, posed a problem for students who found it hard to make time for support sessions. Group A produced the highest percentage of Firsts, which were largely 'unsupported', only using university arrangements. In all groups, five students with unsupported Firsts were born in 1978 or later, and four were recognised and supported from primary school to varying extents.

Data on past experience of learning indicated that the RI attracted more dyslexic students who had been identified in primary school than were seen in Coates' data, and these tended to be especially male. Within two years of dyslexia being identified (post 16), students had often entered university; however some would have already been on Access courses having decided to go into HE. Women were noticeably more likely to have had no support prior to university.

Experience of registering for support suggested a slow, cumbersome process, lacking awareness of course specific problems. Over a third of students felt too much had been recommended in the Needs Assessment report. Where equipment was involved, the funding body's money was wasted when it was bought and then abandoned (35% abandoned something, including training or tutoring). There was potential for discarded items to be sold on, bringing the system into disrepute. Group A used individual support, if they used any. Between 20-25% of Groups A and B could still have potentially benefited from using support. Group D showed the greatest potential to benefit more from support, both from the RI and the DSA.

Most people reported that their main reason for entering HE was wanting a degree for interest or to prove a point. 'Effort' and 'Stress and anxiety' were nodes that occurred most in the WAY Statement node set on Study Issues. Spelling was not a key source of concern. Dyslexic students in HE offered a distinctive profile of learning modes preferences, which appeared unrelated to exposure to support prior to entering HE.

The impression given by this data was that support proved useful and that dyslexia was not interfering with the completion of a degree. Dyslexia and delayed identification did, however, impact on the level of success.

Chapter 8 looks at dyslexic profiles in more depth in the context of research groups.

Chapter 8 – Profiles

8.1 Introduction

Chapter 8 continues the work of establishing a basis for common profiles within the dyslexic student population (Pollak, 2005a). The chapter considers how the students had assimilated dyslexia into their self-concept (McLoughlin *et al.*, 1994) and any implications that might have had for their HE studies. By reflecting on dyslexic experiences combined with personality, it also looks for any distinctive needs or usage patterns in relation to support provision. Anecdotal evidence suggests there were a small number of rather passive students entering HE. These students might be expected to find it harder to take responsibility for determining their own best learning strategies. The research questions covered include consideration of dyslexia characteristics profiles (RQ2), support use (RQ3) and aspects of previous learning experiences (RQ4) as part of the second overall research aim.

This chapter draws on WAIS data, the Dyslexia Background measure, the Support Survey, further WAY Statements, the Big-5 Personality measure, and the interviews. The analysis considers the frequency of responses and themes seen in comments and interviews, finishing with an analysis exploring clusters of students. Several possible ways of determining profiles are investigated: patterns within dyslexia (see *Section 8.3.1*); support use based on statistic-inspired groupings from the measures (see *Section 8.3.2*); and research groups (see *Section 8.3.2*).

8.2 Accommodating Dyslexia

The characteristics of dyslexia experienced by individuals vary, although there may be sub-groups who have similar experiences and comparable responses. One of the influences is gender, which has implications for the age at which identification occurs (see *Section 2.2.1* and *7.2.1 – Identification in HE*) and the subsequent response. Formal recognition of dyslexia can provoke many reactions. Familiarity with dyslexia in others, and family reactions to dyslexia, can also contribute to the response shown.

8.2.1 Experience of Dyslexia

A few references to dyslexia occurred in the Who Are You (WAY) Statements (see *Section 7.2.2 – Perception of Studying*). A node was created for dyslexia from the interview texts

(see *App. 8.1* for how dyslexia was experienced). Some interviewees showed detailed self-knowledge in relation to dyslexia and study. As one female student put it:

'I had always thought I was thick and I could cope because I had always made myself work harder.'

F3

Even so knowing what is going on does not make it go away:

'...some days I'm perfectly fine you would never notice I'm dyslexic. Other days I can't speak at all, I can't read, I can't do anything. It's normally stress and tiredness that does for me.'

F3

A male dyslexic student on a postgraduate course said:

'...a scary bit of dyslexia is not feeling at all safe, that it can just become overwhelming when things aren't going well.'

M15

Hard work masked difficulties in several cases; others reported working slowly as a means to compensate (see *App. 8.2*). There were comments on awareness of differences and on the reactions of others (see *App. 8.3*). Failure by others to recognise the effort involved in producing the 'result' meant that students often felt that they were thought of as lazy or stupid. The impact of a 'label' was mentioned, and reference made to how family members reacted to what was sometimes seen as an explanation, and sometimes a threat to their own self-concept.

Dyslexia in the family

Some students had family role models for handling dyslexia, mostly offering positive strategies. A couple of participants reported that their parents were in denial about their own difficulties. Others had acted as the catalyst for recognition of other family members, or provided a 'second-hand' identification for others within their family.

Of the interviewees, 25 referred to dyslexia within their family. This was mostly to immediate family, parents, sibling or children (not necessarily formally assessed), and in two cases cousins. There were several key points; firstly relating their own experiences to things they saw in their parents, which reduced any sense of isolation.

'My mum is like me, terrible. Very similar problems to me.'

F1

And

'We thought is it heredity and could I have it? So my brothers and sisters, yeah we think we got it from mum.'

F6

For others their assessment helped to bring about recognition for previous generations:

'My father is exactly – he cannot concentrate on things. He has very wide interests. He reads anything. He has no self-esteem. He took a lot of years to study his chemical studies. His family is very intelligent; his father is a doctor.'

F21

Also

'My dad is determined that he is as well, that he's had to live this false life and was never tested as a dyslexic.' F30

Even if not explicitly expressed:

'My dad I suppose ... he never really talked about how he felt about it, but I think in a way it was a relief knowing what I'd got because he was exactly the same as me. In a way he'd got a diagnosis out of it as well.' F9

However, some parental reactions to similarities were less accepting, seeming to reject the assessment of the off-spring's problems:

'We think my dad might be dyslexic as well and he's not willing to accept that' F10.

For F18 formal identification was actually delayed, and it was not:

'...until I came to Uni that I could actually go for the test without my dad knowing about it.'

For students recognised at a later age it was sometimes concurrent with assessment of their children or grandchildren, as mentioned in Coates (2003). This certainly happened to one interviewee:

'My son, diagnosed when he went to private school, he was about 12, ... at the end of it described all about T., and who in the family has reading problems? Everybody kind of looked at me. Oh my God. I always knew there was something different about me but nobody had actually put a word to it.' F19.

Where identification of a son as dyslexic during primary schooling was the first explanation of the mother's difficulties, she reported:

'My son, who is now 15, who has been diagnosed with dyslexia he couldn't understand why I wanted to go back into education because learning sucks as far as he's concerned.' F17

While acceptance of dyslexia in the family is important for the development of self-esteem, a disinterest in studying cannot be overcome by a dyslexic academic role model (see F17 in *Section 8.2.3*).

Dyslexia and previous experience of learning (RQ4)

Age at identification, the point within a student's academic career, has an implication for the development of compensated study skills. Memories of school, when there was no thought, or official recognition, of dyslexia, were mixed. A number of students were proactive, with belief in their abilities, responding to difficulties by redoubling effort or adopting differing study strategies, including using technology. Some were fortunate in sitting at the front of class because they sat alphabetically, or a family interest in electronic gadgets meant that they used spellcheckers and computers. Problems with spelling,

memory and handwriting were often picked up by the students themselves, if by no one else.

Some indications were seen in interviews that students' assessment of their abilities was at odds with that of school; how the discrepancy was reconciled could depend on their level of confidence (see *App. 8.4*). A number of participants had an incremental view that suggested things could be worked on to change subsequent outcomes. It was not clear what caused this, as in a few cases it was happening in the face of withdrawal of parental and/or teacher expectations.

Some students had been to specialist dyslexia schools or schools with support units. For certain students, it took a change of school for dyslexia to be recognised, while others found changing school regularly, as an army child, served only to mask problems. Very few of the interviewees were recognised at primary school, rather than sixth form or during Access courses (see *App. 8.5-App. 8.9*). Those that were recognised early had a range of experiences of support, from individual support to specialist dyslexia schools. The social stigma of being withdrawn from lessons to a special unit was mentioned.

Students who *knew they were dyslexic before entering university* [Dyslexia Background] were 73% male and 59% females. The *age at identification* for dyslexia [Dyslexia Background or Dyslexia assessment] was known for 173 students (see *App. 7.1*), of which 41% were recognised during compulsory education (male 58%, female 31%). Comparing all *age at identification* data by gender (see *App. 7.2*) with Coates (see *Figure 7.1* and *App. 7.3*) showed that of all the male responses [Dyslexia Background], 48% were recognised in primary school, which was higher than in Coates' data (see *Section 7.2.1 – Summary of identification*).

A number of students did not fully complete the Dyslexia Background questionnaire. *Age at identification* was not always known and sometimes the data was extracted from other sources, including reports. The working sample size was 160 (see *Table 5.9* and *App. 8.10*). Of the working sample, 97 knew of or suspected their dyslexia before university and provided *age at identification* (see *App. 8.11*), 54% were recognised before the age of 16 and the end of compulsory schooling. Comparing the working sample to those who knew of their dyslexia (see *App. 8.12*) showed 70% of 18-24 year olds were being identified in HE for the first time with no prior thought of dyslexia and hence support.

This level then dropped with most of the older students, suggesting some might have entered HE because they were now aware of the explanation of past problems and potentially had had support.

As some Historic data was needed to analyse the factors, a modified sample (N=168) was used, consisting of *date of birth*, *start of course* along with *date of identification*. The course date usually referred to September this led to the unusual time spans ('years'). The data was analysed to see both how long participants had gone without recognition, and how they had accommodated dyslexia into their self-perception. Three periods accounted for 36% of cases frequencies of in this sample, and were for identification just before or at university (see *Appendix 8.1.2 – Support versus identification delay*). Those recognised in the two years before university (A-level or Access course possibly); those recognised at the start of study; and finally those who had already started their courses. Mature students usually entered HE within two years of recognition. Of the students starting when they were aged 30 or more, six were male and 24 female.

Reaction to recognition of dyslexia as an adult

The research group codes gave an indication of when dyslexia was recognised, and how it was accommodated. For this sample, previous support and age had little effect on whether a student contacted Support Service. Older students were less likely to have had prior support (see *App. 7.25-App. 7 27*, see *Section 7.2.3 Delay and support*).

The reactions to confirmation of dyslexia included relief, frustration about past struggles, a sense of a glass-ceiling on your future, and the offer of a road-map for your 'journey'. Research Group C had the most to say.

M5, a male undergraduate aged 22, was recognised in the 12 months prior to the interview. His response to suggestions about dyslexia was:

'I was turning round and saying that's a load of rubbish, I don't believe all this dyslexia business.'

Based on a dyslexic friend who was:

'...really hopeless at reading, writing, that sort of thing. I would judge everyone by him and if you weren't like that with the terrible handwriting then you weren't dyslexic'.

However:

'...when I was diagnosed I was like right, I don't know. I didn't really think a lot of it because I've always thought there might be something like that going on. But ... it didn't like upset me; I wasn't frustrated by it or anything like that.'

Some students had gone through all their compulsory education and then had some working life experience before they were identified, usually on returning to study. In general returning to study was either the result of a career requirement or related to proving a point on ability.

F16 was a Turkish postgraduate female, identified at age 35. On identification she was:

‘...relieved because during the support sessions (group) I already realised that I was dyslexic.’

But she expressed the concern that:

‘... if I happen not to be dyslexic then how can I find an answer’.

She said:

‘I’d been searching for a long time, what was wrong with me. I knew something was wrong’. When it was confirmed she felt ‘it puts me down, in the beginning’ and that some months later ‘I’m still negative about it I think.’

M8 was a UK mature male undergraduate identified at about 50 years of age. Looking back on the assessment:

‘... a year ago. When I had the assessment, here ... a lot of favourable aspects ... came up’

But:

‘...really whether its dyslexia or some other thing that might be the problem I’m not convinced.’

F28, a female undergraduate aged over 25 when interviewed reported that when dyslexia was first confirmed:

‘Part of me was “excellent, finally I can get some recognition and put a piece of paper in front of people and say, look don’t put me down, its not my fault and actually I’m pretty clever.” ’

That six people felt the need to comment on delayed identification suggested that there might have been unresolved issues and perhaps things that could have been done differently in their view (see Section 7.2.1 – Response to Identification in HE, and 7.2.3 - DSA support). Another two people appeared to take responsibility for having disguised their problems by effort, or personality.

Support before HE

When asked about receiving *study skills support prior to university* (N=148), the most common response was ‘some’ support (see App. 8.15), closely followed by ‘none’ (41%).

Fifty six percent of women had no previous dyslexia support prior to university as opposed to 31% of men (see *App. 8.20* and *App. 8.21*). In Section 8.2.1 (Dyslexia and previous experience of learning) it has been described that the Dyslexia Background Questionnaire (N=146) indicated that 47% (69) of those who answered reported no *support for dyslexia before university* (see *App. 8.16*). Of 146 students, 102 who knew of their dyslexia and responded to had there been *support for dyslexia before university*, 27% said that they there had not been (see *App. 8.20*). These responses might affect both the degree of difficulty experienced, and the use of support in HE.

One postgraduate student (F26), on a teacher-training course, had found withdrawal from class to a support unit in senior school so stressful and socially detrimental that she avoided any support, including extra exam time, until she had to retake her A-levels. She remained confident in her own intelligence, but chose to follow a creative route in her later studies. Only after the interview she did register at the RI and apply for the DSA.

‘Every university I’ve gone to I’ve never declared my dyslexia though I’ve always told my lecturers, because I did it once and all I ever got was a load of bump and nothing of any use at all. ... I’ve always seen it as something that hangs around your neck, you’re labelled to some extent.’

Students were also asked about sources of dyslexia support (see *App. 8.21*) which showed 44 students (38%) reporting university as their only source of support and a further 32 (28%) as continuing support into university.

8.2.2 Personality

Personality does have a role to play in the preferred form and use of support, at least at the level of sociability and conscientiousness (see *Section 2.2.2 – Personality and study*). Considering the personality factors (see *Section 6.2.4*), where research group data was available (see *Table 8. 1*), Neuroticism had the highest mean across research groups (Sensitive, emotional, and prone to experience feelings that are upsetting – Costa & McCrae, 1992), being greatest in Group C. A high *T*-score was greater than 55, with low being less than 45 or very low less than 35.

Research group	Neuroticism mean	Extraversion mean	Openness mean	Agreeableness mean	Conscientiousness mean
A	55.89	42.22	43.89	42.33	38.33
B	55.91	52.62	54.80	42.69	42.80
C	60.55	52.58	53.36	46.82	43.27
D	57.17	55.50	49.67	47.17	39.00
Unknown	55.33	55.33	51.33	38.00	55.00

Table 8. 1 Research groups and personality trait means

The traits were analysed for the frequency of high or low *T*-scores (see *Table 8. 2* for extremes). The Agreeableness score for the small Group D sample polarised with one third showing a very low (< 35) *T*-score and half a high *T*-score. Low levels of Conscientiousness (Easygoing, not very well-organized, and sometimes careless, preferring not to make plans – Costa & McCrae, 1992), and Openness (Practical, traditional, and pretty set in ways – Costa & McCrae, 1992) might have contributed to delayed contact with the support team.

Research group	N =	Neuroticism >55	Extraversion >55	Openness >55	Agreeableness <45	Conscientiousness <45 (<35)
A	9	66.67	22.22	33.33	44.44	55.56 (0.00)
B	45	48.89	44.44	46.67	51.11	55.56 (26.67)
C	33	57.58	42.42	39.39	48.48	45.45 (18.18)
D	6	50.00	50.00	16.67	50.00	66.67 (33.33)

Table 8. 2 Personality trait *T* score frequency as percentage of research group

Conscientiousness is linked to motivation and academic achievements (Heinström, 2000). However, lower Conscientiousness would indicate a more flexible approach, but greater likelihood of being distracted. Blickle (1996, p. 350) cautiously showed that Conscientiousness and Openness are associated with learning styles and that:

‘...learning strategies seem to be mediators between basic personality traits and performance.’ (p. 350)

Conscientiousness was associated with Entwistle’s Strategic learners, Openness with the Deep approach and Neuroticism with the Surface or Surface apathetic approach (Entwistle and Tait, 1996) cited in Heinström (2000).

8.2.3 Self

Self is a central element to personality. A learnt construct, self is developed by experience and interaction with others and their beliefs (see *Section 2.2.2 – Self-concept*). Deci and Chandler (1986, p. 590) cited Deci and Ryan (1985) reported on how ‘repeated failure (or negative feedback) and unpredictable or uncontrollable outcomes’ threaten the development of self determination. How dyslexic problems are understood and attributed affects perception of scholastic competence or academic-self (Terras *et al.*, 2004).

'Possible self' is a motivational factor in HE study. This section looks at self as determined by responses to the study situation. A paper that derives from this chapter was presented at the British Dyslexia Association Conference at Harrogate on 27th March 2008 and is accessible from the conference CD (Eld, 2008). The attribution of the effect of patterns of strengths and weaknesses had a role in developing a sense of a 'study-self'.

One student (F17) made numerous references to her internal thought process and actions:

'I'm very good at self-talking, I don't know if other dyslexics do that, they sort of talk themselves out of it [the problem].'

In terms of dyslexia, to protect and maintain her self-esteem she felt there was:

'...part of me I didn't acknowledge and I didn't allow the world to acknowledge because I'd put this barrier up to protect myself.'

She changed her expectations by exploring her self-concept:

'[It was] through the meditation group that I started to look at myself differently. I thought "this isn't what I want for me, I'm doing three jobs I don't really want to do and I'm wearing myself out"'.

A better self-concept was part of her motivation to study:

'I decided I wanted to go back into education and deal with that. It had been something in the back of my mind for a long time but it was giving myself permission to change. It wasn't justification about whether I could do it though I had those there as well.'

A successful and highly motivated student (F19) was also forthcoming:

'My parents were absolutely brilliant in building up my confidence and self-esteem. We lived out on the beach, they brought me a dinghy and I sailed. When you're in charge of a boat you don't have to read and write, no one is telling you to do this, that and the other. I was good at it. ... Sailing is such a wonderful confidence booster.'

Defining self – WAY

WAY Statements offered only a snapshot of self perception (see *Section 7.1 – Sample, 7.2 – Experience of Dyslexia in University*). The statements were looked at to identify terms used by the students in defining themselves – their roles in life, their academic life, social life, concerns, emotions, interest, personality and qualities.

The approach taken to completing the WAY Statements varied. One group of participants, including those who had been involved with psychology in some way, found it fairly easy to generate responses. Unfortunately, information on prior exposure to self-analysis tests was not gathered as part of this study, making it impossible to distinguish whether experience or self-awareness was the underlying factor.

Whether the initial type of response was factual or subjective, by the 15th statement most people had resorted to giving both types of information. Statements that were grouped under ‘Facts’ were those, given to fill space in many cases, covering what they were doing or location, nationality, martial status, and religion. In all, these accounted for 18.5% of these factual responses. To put dyslexia in perspective, while almost 13% made factual reference to being a student, only 4.5% mentioned dyslexia (24 out of 534 statements). Actual age or age group (mature student, etc) was more likely to appear in the statements (33). ‘Subjective’ statements covered areas such as self, effort, motivation, and study environment (see *Section 7.2*).

The use of factual and objective statements in self-definition might indicate a reserved nature, either not giving much away or measuring oneself in external terms. This outlook might be more susceptible to interpreting outcomes in terms of external factors which were fixed and uncontrollable (see *Section 8.2.3 – Attribution of outcomes*). A reluctance to define oneself in terms that might be modified by effort or something within ones control might arise from a lack of the kind of the self-awareness needed for good meta-cognitive skills, or fear of change and failing. Objective information had the effect of distancing the researcher, avoiding exposure.

Some people defined themselves by external points of reference, such as physical traits which included weight, height, gender, hair colour, fitness or energy levels and, in two cases, handedness. As university students, it was expected the participants would have incorporated this role into their sense of identity in some form, and that this would manifest itself in some of the statements. There were 534 statements, from 126 participants, that were considered as being factual in nature (see *Table 8. 3*).

Node	No. of responses	Theme
Node 1 of 11	18	Accommodation
Node 2 of 11	33	Age
Node 3 of 11	24	Dyslexic
Node 4 of 11	100	Fact
Node 5 of 11	18	Finance
Node 6 of 11	69	Hobbies
Node 7 of 11	47	Job
Node 8 of 11	61	Physical
Node 9 of 11	83	Role
Node 10 of 11	69	Student
Node 11 of 11	18	Travel & holidays

Table 8. 3 Factual node set [WAY]

Student responses covering accommodation (mostly the merits of leaving halls), holidays or travel, and finance (being poor or broke) were each responsible for between 3 and 3.5% of the factual responses.

Attribution of outcomes

How a person, consciously or more likely unconsciously, attributes the causes of an outcome has long- term implications for self-perception and motivation (Dweck, 2000).

The significant features relate to whether a person perceives the factors as lying within their own control, whether they were internal (ability / traits) or external, and whether they are stable or variable.

Depending on the model of intelligence adopted, ability might be taken as a stable factor; hence when an outcome is attributed to lack of ability, the expectation is that the situation will continue (Weiner, 1986) cited by Hallam (2005). In contrast, effort is internal and can be controlled, because one can choose to apply it, but that also makes it unstable. It is important for students with learning difficulties to retain a sense of control even in the face of negative outcomes, although they appear less likely to do this than their peers (Jacobson *et al.*, 1986) cited by Burden (2005).

Work by Dweck *et al.* (1978) cited in Forsyth (1986) and Dweck (2000) identifies gender differences in the way that praise or approval is given by parents and teachers. This suggests that a dyslexic might receive limited positive comments on their intellectual abilities, but girls would be praised for diligence and good behaviour in other areas. However, dyslexic boys would be likely to attract negative responses for neatness and concentration. Boys would be more likely to become alienated and frustrated by this interpretation of their efforts, and potentially draw attention to their problems by their behaviour. Dweck (2000) emphasises the benefits of giving praise for the procedure and effort rather than ability, thus encouraging the development of strategies to cope with future challenges. Where dyslexic students are praised for effort, they are more likely to have learning rather than performance goals; to be less influenced by being thought to lack ability, and to be:

‘...challenge seeking and persistent and ... [to be able to] tolerate periods of confusion’

Dweck (2000, p. 124)

A mature nursing student (F7), talking about her childhood education, stated that:

‘...my own feeling, I’d done well but the result was not what I wanted.’

When she was unsuccessful, she concluded:

‘Last time I worked 10 hours so I will work 20 hours and see what I will get. Not knowing even if you worked 30 hours the problem is somewhere else.’

The demands of schooling are inescapable in children’s lives. In the absence of strategies that could help, academic failures may be generalised as having a cause of a stable nature, and appear to be beyond a person’s control resulting in learned helplessness (Abramson *et al.*, 1978) cited by Burden (2005).

Once the perception has developed that something is beyond one’s control, it cannot easily be challenged. The best situation is when failure is attributed to a lack of specific strategies or skills, not to general ability (Clifford, 1986) cited by Hallam (2005). The ideal situation for good motivation is for success to attributed to internal causes, and being unsuccessful to external factors (Harter 1985) cited by Hallam (2005).

One interviewee had a well-developed sense of attribution. When discussing note-taking, it was clear that she (F19) had accepted the need to do things differently, using external strategies, and only compared the outcome, not the process.

‘I don’t care; I’m not comparing myself. I can’t do it and I’ll never do it. Its not important, I just get on with my own thing [way of note taking].’

Motivation

Motivation refers to the drives that initiate and ensure persistence with activities, actions or behaviours (see *Section 2.2.4 – Motivation for entering HE, Table 7.2, and App. 7.6*). The motives identified from ‘*reasons for taking the course*’ (see *Table 7.2 and App. 7.6*) included career demands, interest and enjoyment, plus, in open questions, much was said about the need to prove a point about ability.

Interest in modules was a motivating factor: according to MQ19:

‘I love the law, and I want to give it 100%’.

Several students expressed enjoyment at the thought of study:

‘I was very willing to return to the student life & education environment’, (F16);

‘Finally I would study something I wanted to do!’ (FQ25);

‘...just looking forward to do a vocational course’ (MQ20).

The course itself, the subject content or grades was the source of motivation given in 26% of statements, while for nearly 19% it was job or future life related, including comments such as: 'I aim to go and work abroad, marketable skills' (F22).

The desire to prove a point to themselves or others accounted for 15% and the remainder referred to concentration abilities or determination. To prove a point:

'[I] wished to further my education so as to fully satisfy my potential and enjoy the lifestyle' (FQ27),

'My full potential finally, once again, recognised and shown.' (F3),

'I wanted to succeed (sic) to prove everyone that I could do it.' (F31)

'... to prove that I was not stupid therefore able to do a more interesting and relievent (sic) job' (FQ10).

'To prove to my self that I could learn given the correct environment and support.' (M11),

'I hadn't done brilliantly in my A levels and I wanted to prove to myself that I wasn't thick.' (F9)

WAY statements relating to motivation were made by 44 students, of which nine made more than one. Of the 53 passages in this node, 85% were of a positive nature, the rest mentioned boredom or lack of motivation as part of their self-definition. What motivated or de-motivated them was not clear in 30% of responses.

A confident person would be able to support positive views of a successful 'possible-self', which underpins motivations such as wanting a career and 'proving a point'. Both motivations require the investment of effort based on faith in your own judgement of your abilities and accommodation of past academic outcomes (see *Section 8.3.2 – Attribution of outcomes*).

The impact of parental support on confidence was clear for F19:

'My father said "you can do anything you want if you want to do it". So that became my ... even now 'no' doesn't enter my head ... even now if I want to do something come hell or high water I will do it. It might take me 10 years whereas it might take someone else one year.'

'I'm a real goer, my parents had given me the confidence so I just went ahead and did things. Some people get introvert and won't do anything, their confidence is knocked out of them. That wasn't me, I'm a fighter,'

The level of her sense of self-worth is evident from her philosophy to continuing study.

'It was going to be fun because everything I do has to be fun. If it's not fun I don't do it. So I would make it fun and if I couldn't make it fun and I really hated it then its time to move on.'

Others would not risk dyslexia being taken as the reason for 'failing' to complete their course.

Attribution relates to Dweck's (2000) work on perception of personality as fixed or changeable (see *Section 2.2.3 – Personality and study*). When self is taken as a fixed entity, this model can lead to labelling and the use of stereotypes, preventing effort and pointing towards learned helplessness as a response. The incremental view incorporates the possibility of change and looks for feedback on which to base change, such as is given through support. Few HE students are likely to demonstrate learned helplessness, unless passive acceptance of parental expectation had led to enrolment.

Motivation relates to achievement of goals. According to goal theory, the aim is selected either to avoid failure or to achieve success in learning. Dyslexics could lose out on success with both goal types (see *Section 2.2.4 – Motivation for entering HE*). The goals seeking mastery of a skill or knowledge often involved challenges or risk of failure, unlike performance goals which aim to maintain appearance of success. Where there is a strength – sports, music, art – that can be relied on, performance against others can be used as a measure of success and confidence boost. According to Grimes (1981, p. 93):

'Mastery-orientated children do not take a personal view of failure, but often view negative feedback as a challenge and, consequently, increase their persistence'.

The more a skill is valued, the greater the impact of success. If memory and co-ordination are unreliable without the right strategies, then mastery goals are at risk. How the successes and failures are valued and attributed have subsequent impact perception of self and potential. M16 saw himself as good at football and bad at reading, but did not have a problem with this as he believed that only some people were successful at either. A greater problem arises if your view is that everyone learns to read in junior school, and you have not. The responses to the uncertainties about outcomes vary; contributing factors include both personality and the goal types in use. One mature, female dyslexic said of working in schools as a learning support assistant:

'I identified three categories, the ones that went into their shells, the one who was a class clown and one who became a bully'. (F6)

Some students 'hide' at the back of class, others 'act out' in frustration, or find a study buddy who will fill in the 'gaps'.

8.2.4 Adjustment to Dyslexia

Once dyslexia has been recognised, there is the issue of what this meant for the person. This will be influenced by one's own level of self-esteem and concepts of how much change in 'intelligence' is possible (see *Section 2.2.2 – Self-concept*). Four levels of awareness of, and compensation for, dyslexia have been suggested (McLoughlin *et al.*, 1994, p. 3). In new or novel situations the strategies for compensating may not be in place and the level of accommodation may drop, causing extra problems due to lack of control of the situation, thereby increasing stress (see *Section 2.2.3 – Coping strategies*). Without timely intervention, a vicious circle can be created, with anxiety causing more dyslexic behaviour, further undermining existing strategies.

The point at which dyslexia was identified has an implication for the development of compensating strategies. The compensating study skills include attitude, the strategies and accommodation of difficulties, and could influence choices about further study (see *Section 7.2.1 – Identification in HE*). The Dyslexia Background and Support Questionnaires were used in conjunction with interview themes and quotes to investigate previous learning experiences. The sample size for the Dyslexia Background Questionnaire (see *Appendix 3.4 c*) was 160, with 146 answering the following two questions. The majority *knew of their dyslexia* when selecting their course (see *App. 8.16*), but 28% appeared to have had no awareness of their dyslexia prior to university. Of those answering, 47% had not had explicit *support for dyslexia* (see *App. 8.17*).

Study

Details of reasons for taking a university course were analysed in Chapter 7 (see *Section 7.2.2* and *App. 7.6*). Module choices were influenced by assessment format, particularly in relation to exams (see *Section 7.2.2 App. 7.8–App. 7.11*). The approaches to study include Learning Mode preference. Regardless of research group, half of the students, or slightly over, appeared multimodal by preference of Learning Mode according to VARK. Of those with single mode preferences, most with a preference for reading were in the research Group B but only formed a small part of the group, with one person in Group C.

A number of different HE student study approaches have been recognised (see *Section 2.2.3*), including aspiring to the 'reasonable adventurer'. This research looked at perceived experience and support use, with the expectation of seeing change within personality, approach, and outcome as a result of support. The individual's interpretation of

experiences and outcomes was considered pivotal to issues of motivation, learning, and the concept of an academic 'possible self' (see *Section 8.2.3* for Self and Motivation).

Therefore, interview nodes were established that covered strategies for both learning and coping with dyslexia, various aspects of support, and achievements and events that develop confidence and self-belief.

Study environment

Preferences for study environments are part of the approach to study. They include a variety of issues with sensory distraction but also spatial requirements. The first response of three interviewees to 'What distracts you?' was 'Everything!' How much space there was and how things were organized in that space was a recurring theme.

The comments on 'noise' covered those who found it a distraction and those that found it prevented silence becoming distracting, potentially related to extraversion level (see *App. 8.22*). Seven people referred to the problems of working in the shared computer rooms, particularly in relation to noise, but also to movement of people and the space available (see *App. 8.23*). As well as observations about TV, four people specifically mentioned listening to music or classical music. Although there were comments on distraction and noise in relation to study, they did not seem to reflect the findings of Cassidy and MacDonald (2007). There was no apparent relationship between distraction levels and extraversion scores.

One aspect of organization was the need to 'see' material to remember to use it, which seemed to be compensating for weak memory skills (see *App. 8.24*). Another was that clear space avoided confusing the thinking process (see *App. 8.25*). Finally, there was the need for a personalised environment; as well as tidiness there were issues of cleanliness, temperature, and lighting (see *App. 8.26-App. 8.28*). One point mentioned was the ability to go and make a cup of coffee, the significance being that if time had been spent setting up the environment, there was no need to pack up to take a break.

Extremes of support at school could be so off-putting that support was subsequently boycotted at university (Group D), or successful (Group A). Alternatively, school support could have been so discrete that little sense of difficulty developed. Where confidence was created without understanding of the difficulties, potentially there could be implications for developing the ability to handle the challenge of new academic situations or exposure to

failure (Dweck, 2000). For other students, a comment from a class teacher was enough to give affirmation of abilities or recognition of difficulties, and this gave the confidence and motivation to continue study.

University support

In general, women were slightly more likely to use support in HE (see *App. 8.29* for breakdown). The impact of *age identified* was considered in three groups; identification at school, post school (18-24 years) and mature. There is a noticeable difference between genders for having been identified at school (see *App. 7.2*). Amongst those identified at school, gender did not make a difference to research group distribution (see *App. 8.30* and *App. 8.31*). They mostly fell into research Group B. Gender did show marked differences in the point at which dyslexia was confirmed during schooling (see *App. 8.32-App. 8.34*). Group C included two participants who apparently were recognised in primary school but became disassociated from dyslexia during secondary school.

The category of 'Key support' referred to Group study skills sessions, the Learning Skills module and individual support. 44% of the women used key dyslexia support in HE and 20% of men (see *App. 8.35* and *App. 8.36*). A delay in recognition had an impact on support usage (see *Section 7.2.3 – Delay and support*, and *Section 7.3.1*). Students identified at school showed the lowest use of key support in HE. Those identified post school were more likely to use key support of all types and to use more of it (see *Section 7.2.3*). Regardless of *age at identification* individual support was used most, but the greater the age the more likely was use of it or any other support (see *App. 8.35*).

Of those who had responded to a question about the amount of *study skills support before university*, in total 53% did not use key HE support, of which 38% had had no previous study support and used no key support. Those who felt they had had '*more than enough*' study support did not use the key support in the HEI. Individual support was the most used type of support, even more so if there was 'some' previous experience of support (see *App. 8.15*, *App. 7.28* with gender split). Looking at those identified at school, including sixth form, the males in this study did not use the Learning Skills module at all (see *App. 8.36*).

Students in the RI with prior awareness of dyslexia (Groups A, B and D) had mostly had time to look round, consider the options and assess the success of other dyslexics. Group D felt like 'going it alone' because university was the first time they had a choice about

support, they wanted to prove a point, or arranging support was too much effort or not a priority. Some students responded with 'I've got this far alone' views, others with 'I've had more than enough support'. F11 said:

'... at the moment I'm finding it very hard to change the way I do things because I think "well its worked so far."'

Group C had little or no idea of having dyslexic difficulties (McLoughlin et al, 1994 pp. 50-1), believing that everyone also had strategies, or thinking of their entry to university as having been a bit of a fluke. A few students were aware of dyslexia but did not see it as reflecting their difficulties. For Group C, the delay of recognition, often until the second year of study when all modules count towards final results, made experimentation risky. One student stated:

'The procedure through which to gain help for dyslexia should be clearer as time and confusion over how to go about it put me off.' (FQ29)

The final year usually includes a dissertation, which accounts for most 'spare' time, making uptake of support very difficult at this stage. Comments from the Support Questionnaire indicated that time constraints influenced some other support decisions (see *Section 7.2.3*). For instance, nurses commented on time problems related to fitting training in with placement commitments.

8.3 Profiles

While distinctions between the learning profiles of dyslexic and other HE students have been seen, there is also the question of whether there are sub-groups amongst dyslexic students. In previous chapters, students have been grouped by dyslexia parameters, statistical clusters or research groups. This section investigates these different groupings in terms of the patterns of study and support use. The depth of support information available varied, but the absence of detail did not mean that it was not used.

8.3.1 Patterns of Dyslexia

The WAIS-III indices (see *Section 6.2.1* – WAIS) offered a start point for establishing sub-groups. Overall the scores reflected the pattern seen earlier in relation to those of Grant (see *Figure 6.1*). WAIS-III gave the clearest grouping, by a single measure, using two-step cluster analysis (Wcl 1 and Wcl 2) (see *Section 6.2.1* WAIS – Cluster analysis). The visual skills (POI and PSI) in Wcl 1 were stronger than those of Wcl 2 and formed the larger cluster (see *App. 8.37* for age group identified, *App. 8.38* for breakdown of indices by

cluster, gender and age). Distractibility, slow processing and poor memory in Wc1 2 appeared to make dyslexia, in this smaller group, marginally more likely to have been picked up at school (see *App. 8.39* for summary).

While dyslexic students in HE appear to have WAIS scores that differ in pattern from non-dyslexic students, this sample did not provide adequate evidence of sub-groups. In line with Grant's work, details of literacy skills and some key personal history responses would be needed in conjunction with a larger sample before sub-groups could be discounted.

8.3.2 Support Persona

Anecdotal evidence suggested that two approaches to support were used: one depending on the need for immediate or specific answers, and one depending on group sessions where others could be the focus of attention on occasion. The latter offers time to process the session content.

There were also issues about the concept of fair support. Some of the able dyslexics felt uncomfortable with extra exam time, etc., if they were already out performing many members of their class, even if that meant not showing their true potential. They questioned whether the 'playing field' was 'level' for others, such as students who had to work as well as study, the able dyslexics wondered about the concept of fair support. Some students were concerned that blue cards (see *Section 7.2.3 – University support as experienced*) requesting dyslexia-aware marking limited their grades. These students had managed to move to a pro-active level of study, meaning that they were well able to rate their abilities and use the most effective methods for the task in hand.

Looking at students who had a known research group (N=1214), for 973 students (80%) one or more flag values had been set indicating the use, or not, of support at university (see *App. 8.40*). Some of this data came from university systems including the Personal Information Portal (PIP) and Student Services summary records for leavers, some from students' responses to questionnaires. Of the 842 (69%) with data on the use of exam arrangements, only 10 had declined arrangements, although there was some uncertainty about whether this meant that no support was used in three cases. A further 15 had conflicting responses or no details beyond support being used.

It was possible to look at support usage in relation to different student groups where there was more data. The research offered several possible ways to differentiate dyslexic students, which might have reflected differences in support needs or use.

Clusters and support use

This section considers how the statistical clusters related to the reactions and strategies adopted by dyslexic students. As mentioned above, of the single measures the WAIS indices clusters (Wcl 1 and Wcl 2) showed two distinct profiles. The only distinguishing feature of the combined measures with WAIS focused on POI and associated higher or lower set of mean scores for other indices. The way that the effect of these patterns of strengths and weaknesses were attributed had a role in developing a sense of a 'study-self'.

Responses to dyslexia by Wcl 1 and Wcl 2 were not found to differ greatly. Two thirds of cluster Wcl 2 reported no experience of support before university and they were no more likely to use some support than Wcl 1. The research group to which a student was allocated (see *Section 5.4.1*) reflected a response to previous experience or an organisation issue. Wcl 2 were less likely to be in research Group B (contacting Support Services after entry) than Wcl 1. A higher percentage of Wcl 2 (13%) were in Group D (delayed contact) than for Wcl 1 (5%), but the numbers were small. To a greater extent, Wcl 1 had chosen courses with an applied element, and more of them reported having exams and using the provision for exams. However, usage of key types of support, where known, did not vary between the WAIS clusters. Availability of more details of literacy skills could have improved the attempts to identify sub-groups.

Investigation of case clusters using all measures (N=32), including WAIS and BDA, showed two distinct profile clusters within participants (Cmb cl1, Cmb cl2), revolving round POI (see *Section 6.3.3*). The combination of data from the measures MI, Big-5 and VARK, gave an expanded sample (N=92) and two profile clusters (CmbA cl1, CmbA cl2) focused on personality and study, differentiated by Extraversion, Neuroticism, Kinaesthetic and the total score for MI (breadth of interest) (see *Section 6.3.3*). The Big-5 questionnaire covered personality while MI and VARK shed light on study preferences.

Clusters Cmb cl1 and Cmb cl2 both showed the same percentage of participants recognised as dyslexic while at school. The sample was too small to consider the age bands within which this occurred. There was no variation between the clusters in use of support (53%)

at university [Background] or the number of courses with placements undertaken (42%). Within this sample Cmb cl1 had no cases in research Group A (contacted Support Services before entry) and only one in Group D, whilst the reverse was true of Cmb cl2.

The combined measure cluster CmbA cl2 was the larger cluster (N=49). A greater percentage of CmbA cl1 (30%) were recognised during compulsory schooling (CmbA cl2 18%) and showed signs of slightly more support before university. More of CmbA cl2 took courses with placements but fewer exams and were more likely to pre-contact HEI as part of research Group A. There was a greater percentage of students recognised as dyslexic in HE (Group C) in CmbA cl2, as well as those delaying contact with the support services (Group D).

Research Groups and Support profiles

The gender split varied between the research groups (see Table 8. 4); the *age at start of course* was available for 70-80% of each research group (see Table 8. 5).

Group	female	%	male	%	total
A	26	33.3	52	66.7	78
B	254	47.8	277	52.2	531
C	201	59.1	139	40.9	340
D	100	37.7	165	62.3	265
Total	581		633		1214

Table 8. 4 Research groups with gender split

Group C had the highest percentage of mature students.

	A	%	B	%	C	%	D	%
under 21	43	63.2	341	68.3	142	45.2	170	67.2
25+	10	14.7	77	15.4	89	28.3	34	13.4
Ages Total	53	77.9	418	83.7	231	73.5	204	80.6
RGrp Total	78	100.0	531	100.0	340	100.0	265	100.0

Table 8. 5 Research groups, age at start of course

For further descriptive statistics for research groups see Section 7.3.2 (see App. 7.142–App. 7.146 for Group A, App. 7.147–App. 7.150 Group B, App. 7.151–App. 7.154 Group C, and App. 7.155–App. 7.158 Group D).

One of the aspects investigated was students’ attitudes to support in relation to their identification as school, in terms of research Groups A, B and D. Initially Group C students were not in a position to use RI support (see Section 7.2.3 – Delay and support) and so were excluded from the analysis. Of those responding to *support prior to HE*, the smallest group was men who had had no support (11%), and the largest group were women

with no previous support (36%) as a result of delayed recognition (see *App. 8.41*). Experience of prior support was seen in slightly over 50% of the sample. Those who had ‘plenty’ or ‘some’ support before university were most likely to register with the dyslexia support team as they started their course. Those with previous study skills support experience who responded that they had had ‘plenty’ of support before university were predominantly identified as dyslexic before the age of 11. This was also true for a quarter of those who had had ‘some’ support. Other students did not always feel registration was a priority, which might reflect an inappropriate view of the benefit or need for support. For students both with and without pre-HE support who did eventually register, 13-15% tried to ‘go it alone’ without support. Some felt they had ‘got this far’ without support and others had had ‘more than enough’ support.

Those identified after school were at least twice as likely to be using key support and this increased with people identified after the age of 25 (see *App. 8.35* and *Section 8.2.4 – University support*). Where identification had been delayed, students were more likely to be using more than one type of support and they were the greatest known users of individual support sessions.

Thirty percent of participants reported support from more than one source (see *Figure 8.1 – summarises App. 8.21*). By far the largest amount of support appeared to be used at university. This might have been a matter of increased awareness of dyslexia and the availability of support.

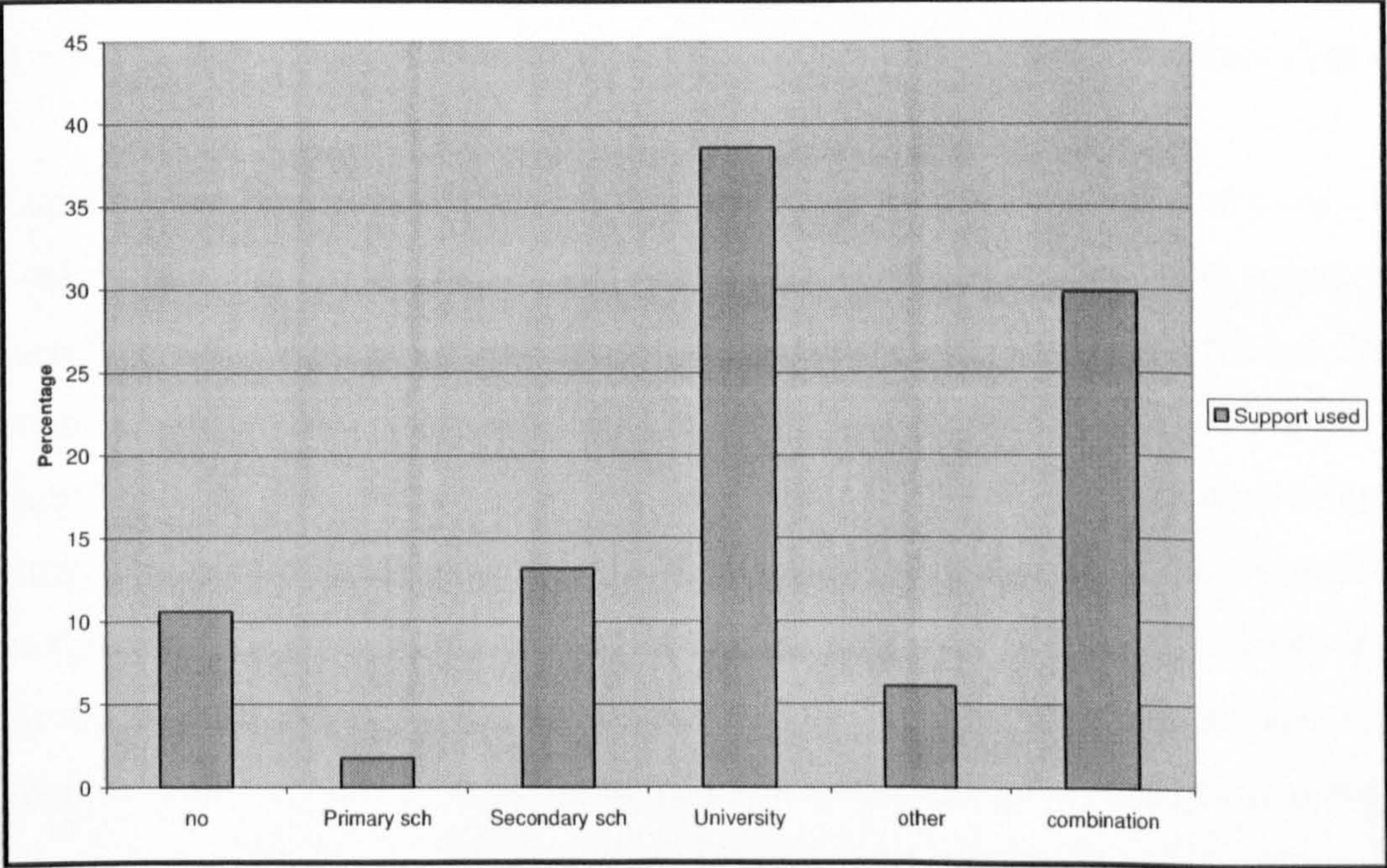


Figure 8. 1 Support use summary [Support]

Of the mature students (over 25 years at start of course) where the research group had been determined, only 42% were Group C (those not recognised as dyslexic until studying at university). A greater number of mature students were returning to study because they had been identified as dyslexic after school, but before university.

Looking at the research groups and the number of contacts made with Student Services [Leaver’s data], disregarding DSA support use, (see *Table 8. 6*) different patterns can be seen. A high number of Group D made minimal contact when they did register. Having initially taken the view ‘I’ve got this far I’ll go it alone’ it seemed that they were either reluctant to change, simply disorganised or had little of their course left when they did register (see *Section 8.3.1* for Group D personality traits). About 10% had a high contact rate.

Grp.	min <5	%	low	%	Moderate 5-10	%	regular 11-20	%	high 20+	%	very high	%	total
A	35	54.7	7	10.9	13	20.3	7	10.9	2	3.1	0	0.0	64
B	251	51.3	42	8.6	129	26.4	46	9.4	17	3.5	4	0.8	489
C	146	49.3	29	9.8	99	33.4	17	5.7	4	1.4	1	0.3	296
D	140	56.9	19	7.7	61	24.8	15	6.1	10	4.1	1	0.4	246

Table 8. 6 Contacts with Student Services by Research group, frequencies and percentages

Of the key support types, data recorded on the Learning Skills module were virtually complete, but individual support use was under represented. Often individual support was only referenced in Leavers’ data if there was a problem. There were questions in the Support Questionnaire, but care has to be taken with this data, as support use may be unrecorded in between 16 and 20% of cases (see *App. 8.40* and *App. 8.41*). Nevertheless, it was found that *Individual* support was the most commonly used form (see *App. 8.42*).

Support used, both general and key, was broken down over the research groups. The analysis showed that almost 70 % of cases as answered about using exam arrangements (see *App. 8.40*). Group C appeared least likely to be using the exam provision. Individual support was the most commonly used key support in all research groups. Three ways of sampling were used, becoming progressively more restrictive, with the third sample limited to cases with PIP details for the final award (see *Table 8. 7*). Key support usage analysed by research group showed 18 cases in Group A, 144 Group B, 91 Group C and 58 Group D (see *Table 8. 7 – Sample 1*). Some of these cases were using multiple types of support. *Sample 2* and *3* only considered participants who gave permission to access PIP, in which research Group D was under-represented. Restricting the cases to those with PIP outcome data gave a sample of 166 students – *Sample 3*, (see *Section 7.3.2*).

	R Group totals (see Section 7.2.3)		R Group and support		R Group and PIP - Sub-set of Sample 1				R Group With PIP final Awards - Sub-set of Sample 2			
	Sample 1		Supported?		Sample 2		Supported?		Sample 3		Supported?	
		%	yes	No?		%	yes	No ?		%	yes	No ?
A	78	6.4	18	60	18	9.6	3	15	16	9.6	3	13
B	531	43.7	144	377	97	51.6	42	55	87	52.4	38	49
C	340	28.0	91	249	51	27.1	27	24	43	25.9	23	20
D	265	21.8	58	207	22	11.7	7	15	20	12.0	6	14
	1214		311		188		79	109	166		70	96

Table 8. 7 Research groups, supported or support use unknown [PIP]

Initially *Sample 1* was used without PIP data selection criteria to show a support usage, including the number by research group using support and multiple support types (see *Table 8. 8*).

	Research groups								
Gender	A	% of gender	B	%	C	%	D	%	Totals
Male	10	7.0	66	46.2	35	24.5	32	22.4	143
Female	8	4.8	78	46.4	56	33.3	26	15.5	168
Total	18		144		91		58		311
Support Type	A	% of support type							
Group	8	7.5	53	50.0	32	30.2	13	12.3	106
Module	3	3.3	38	42.2	32	35.6	17	18.9	90
Individual	12	6.0	88	44.2	60	30.2	39	19.6	199
Multiple used	5	6.0	35	41.7	33	39.3	11	13.1	84

Table 8. 8 Breakdown of research group (Sample 1) by gender and support used

Group A was least likely to use the Learning skills module. Although it was a relatively small percentage compared to Groups B and C, Group D were most likely to use individual support, which suggests that intensive and specific help was sought by some once registration occurred (see *Table 8. 9* and *Section 7.2.3 – Support in groups*). Group D was also least likely to use multiple support types. Group A (*Sample 1 – supported*) had five cases (27.8%) of *Multiple support* use combining *Individual* with *Group* sessions, or the *Module* in one case (see *Table 8. 9* and *App. 8.43*). The highest use of *Multiple support* was by Group C, with almost a third using more than one type and five students (5.5%) using all types. In the initial stages of recognition Group C were using types of support which were not dependent on DSA funding, such as *Groups support* sessions. Group D were least likely to use *Multiple support* types, although a fifth (11) did (see *Table 8. 9*). Over two thirds used individual support (39).

Support	Research groups			
type used (N=311 – support use 395 cases)	A (N=18) %	B (N=144) %	C (N=91) %	D (N=58) %
Group support	44.4	36.8	35.2	22.4
Module support	16.7	26.4	35.2	29.3
Individual support	66.7	65.9	65.9	67.2
<i>Multiple support</i>	<i>27.8</i>	<i>29.1</i>	<i>36.3</i>	<i>19.0</i>

Table 8. 9 Type of support used by Research group, for supported students as percentage

From Chapter 7 it appeared that Group A had their dyslexia situation in-hand (see *Section 7.3.2*). Using *Sample 2* (see *Table 8. 7*) with PIP data (N=188), Group A's use of support was limited to three cases (17%), all including individual one-to-one support (see *App. 8.44*). *Sample 3* showed that in two cases a second form of HE support was used and the resulting degrees were Lower Second Class Honours, whilst the student using solely individual support achieved an Upper Second. Of those only making use of university arrangements (no Learning Skills module, groups or tutors) two were awarded First Class degrees, suggesting that they were already pro-active learners and aware of their needs. There were three Lower Seconds and two Ordinary degrees with unknown support usage, but in Group A overall students were much more likely to get an Upper Second than in other groups (see *App. 8.45*).

Group B showed the best results, including three of the Firsts awarded to unsupported students (see *App. 8.46*). Forty-four percent of this group were supported (*Sample 3*, N=38). Of the unknown support sample (N= 49), 25 were awarded Lower Seconds, Thirds or Ordinary degree passes (see *App. 8.46*). In general, Groups A and B functioned at McLoughlin's top level of accommodation (see *Section 2.3*), (McLoughlin *et al.*, 1994).

In Group C (*Sample 1*, N = 340) 74% (244) of this group used some support (see *App. 8.42*) and *Sample 2* and *Sample 3* showed that 53% used some of the key supports (see *App. 8.48–App. 8.49*), making it the only group of students in this research more likely to be using key support than not. Group C (*Sample 3*, N=43) (see *App. 8.49*) in general showed nearly a 10% higher use of support (53.5%) than the next nearest group, B (43.7%) (see *App. 8.47*). Of the 20 unknown support-status participants (*Sample 3*, N = 43), seven had Lower Seconds, Ordinary degrees or failed (see *App. 8.49*).

The size of Group D (*Sample 3*) was small, due to lack of participants and permission to access PIP. This group used support in 30% of cases (see *App. 8.51*) and barely used

Group sessions at all (see *App. 8.50*). Forty percent (8) of the awards were Lower Seconds or Ordinary degrees (see *Figure 7. 4*, and *App. 8.51*), with only two of these students using the *Module*, and one *Individual* support. Group D seemed most likely to be unaware of the impact that dyslexia had on their studies.

Although the samples were small, the course outcomes and results for each research group were reviewed in the light of their use of key support. Of the Group A participants, the unsupported were most likely to achieve an Upper Second, rather than the supported group (see *App. 8.45*). For Group B, the supported group tended to get an Upper Second, whereas those with 'unknown support' tended towards Lower Second awards. This group had the only supported First Class degrees. Research Group C was the only one to have more supported participants than unsupported, and an Upper Second was the most common award, with or without support. Regardless of the usage of support Group D were predominantly awarded Lower Second Class honours.

Both Groups A and B had past experience of support from more than one source. Of the newly recognised dyslexics (Group C), 68% were using university support, more of it than the other groups. In general, students with prior support were making less use of university support, about 54%.

8.4 Findings Summary

It is important to recognise how each student has accommodated dyslexia on entry to HE, not just for the literacy skills and study strategies but also self-concept. This chapter tried to form profiles based on patterns of dyslexia, differing support needs or strategy patterns.

The so-called 'reality' of previous educational situations had less significance than the perception of it. Taking students' accounts of experiences of learning and support, it was clear that it was the perception and conceptualisation of it that impacted on future behaviour (see *Section 8.2.4* – University support, above or *Section 7.2.3* – University support as experienced). The impact of the age at which dyslexia was recognised was noticeable, affecting both the amount and type of support used. The development of a proactive approach to study and improved self-awareness, which helped understanding of support needs and their relevance, was important.

Attempts were made to determine whether different manifestations of dyslexia were seen within in dyslexic HE students. Further data covering literacy skills, beyond the WAIS IQ test, would have been needed to be able to determine if there was an important sub-division within dyslexic HE students. The existing data indicated that perceptual organisation (POI) was the distinguishing index (see *Section 6.2.1* – WAIS – Data reduction and *Section 8.3.2* – Clusters and Support).

The development of self-knowledge and a sense of responsibility were an important part of support. Differences in pre-university recognition and support did not affect the use of university support. A decline in demand for support might have been anticipated as students with better experience of support in school, as the result of legislation changes, came through into HE. This research did indeed find that dyslexic students identified in primary school and supported before going into HE were most likely to get a First Class degree without major support at university. However, diversification of the HE student population has prevented the decline in demand, and the greatest use of support was found amongst students who were only identified whilst at HE. For some students, HE was the first time that they could make their own support decisions, and they initially opted to decline.

Avoiding support had the potential for creating a self-fulfilling prophecy, i.e. it tended to reinforce the self-image of not being academically able. This image could be a

comfortable one for some students, as it did not require them to confront issues of change and missed opportunities. While changing learning habits as an adult can be a challenge, especially if study strategies have 'worked' well enough to get a student to university, the motivation to achieve successful outcomes can do much to overcome resistance to change. The analysis showed clearly that the later the recognition of dyslexia, the more use of support occurred, but it was also potentially harder to adopt new strategies. Most successful personas were underpinned by a pro-active disposition and could be developed to include adequate meta-cognitive skills.

It was found that the WAIS indices clusters (Wcl 1 and Wcl 2) and combined measure clusters (Cmb cl1, Cmb cl2) had little implication for support usage. Neither did gender, although there were marginal indications that men were more likely to use the Learning Skills module, while women preferred the individual support option (see *App. 7.117* and *App. 7.125*, and *App. 8.29* and *App. 8.36*). However, analysis based on the research Groups A-D showed up some interesting patterns.

It appeared that Groups A and B understood their situation as regards dyslexia and had it relatively in hand, although perhaps 20% would have potentially benefited from using support. Group A used individual support if any, and half were aged under-21 years old when they started their courses. Group A split between the 'needy', making early contact and actively using multiple support (6%) or individual support (9%), and the 'well-prepared' student who was organised but did not place great demands on support services (see *App. 8.47*). Some higher achievers were not using support at all, perhaps because it was not a good use of their time, as they already had the required skills. The lower achievers might have faced too many challenges coping with the demands of HE and their courses to remain in control of getting support in place.

Group C used a wide range of support to put dyslexia in context for both life skills and study. They showed the greatest potential to benefit from more support – in the form of individual sessions – beyond that which the university offered. Group D might have had previous experience of inappropriate support, and could have benefited from taking a fresh look at what was available. Many of Group D did not seem fully aware of their 'real' situation; some had a poor appreciation of their own needs, and the timescales involved in finding solutions, so putting their studies at risk.

There were no other distinctive patterns found in the use of support provisions within the groups. Both Groups C and D could have benefited from increased awareness that the university experience is about the whole learning process, i.e. about acquiring skills as well as subject content. A better understanding of the impact of dyslexia on their studies and the merits of meta-cognitive awareness in approaching new challenges could make them aware of the part which support could play. Using support to become a pro-active learner, aware of ones own abilities, taking what support there is on offer and discarding what is not personally beneficial, is not taking an unfair advantage.

There will always remain the possibility that those not using support could have achieved better outcomes, or the same outcome for less effort, with appropriate guidance. There seem to be students who could have benefited from being targeted with suitable support opportunities, including Learning Mode awareness, with a view to improved meta-cognition. This data indicates that the type of support needed depends on age (see *Section 7.2.3 – Support arrangements*) and age at which dyslexia was recognised.

Chapter 9 – Discussion

9.1 Introduction

In this final chapter the key findings of the research are highlighted, and each of the research questions set out in Chapter 2 is then discussed. The limitations of the research are addressed, and recommendations arising from the research findings are presented, including possible directions for future research. Finally, the implications for support provision in Higher Education are considered.

The five research questions (RQ) can be grouped into two key aims:

1) To determine the nature, demographic and characteristic, of the HE dyslexic population, nationally and within the RI, with a view to identifying potential sub-groups.

- (RQ1): What was a representative sample of students with dyslexia within the university population, based on gender, age and field, considering both national and case study institution data (see *Sections 2.2.1 – Age at identification and gender, and 2.4.1; Chapter 5*)?
- (RQ2): What characteristics offered the best means of defining and recognising various dyslexic profiles, preferences and approaches to study (see *Sections 2.2.2 – Personality and study, 2.2.3 – Learning personality, and Learning styles; Chapters 5, 6 and 8*)?

2) To examine the actions and experiences of the dyslexia student population before and during their time at the RI and implications for support practice.

- (RQ3): What were the factors influencing the approach to registering for support and using it. What was the impact on students (see *Sections 2.2.1 – Late identification, and Age at identification and gender, and 2.5.1; Chapter 7 and 8*)?
- (RQ4): How was the experience of studying at the RI influenced by the approach to learning adopted, and what was the influence of previous learning experiences / situations (see *Sections 2.2.1 – Late identification, 2.2.3 – Coping strategies, and 2.3.1; Chapters 7 and 8*)?
- (RQ5): Did dyslexia and experience of support (based on self-report) impact on the outcomes and course results for these students (see *Section 2.2.3 – Outcomes; Chapters 7 and 8*)?

9.2 Key Findings

The most important findings were that the later the identification of dyslexia, the more support was used at the RI, and that female students were more likely than their male counterparts to be first identified in HE. Earlier recognition and support had implications for HE success. The Perceptual Organisation Index (POI) of the WAIS-III IQ test was central to grouping participant cases, either by a single measure or as part of a combination. However, the self-awareness and motivation associated with well-developed meta-cognitive skills were most important to study outcomes.

The further key findings relating to the first aim were:

- In a growing student population, the proportion of dyslexics in the student population increased, unlike that of other disabilities.
- Wider availability of DSA funding led to increases in dyslexic student numbers wanting support, including those on courses.
- Gender ratio in the RI was consistently close to 40:60 (male : female) over nine years, differing from the HE population as a whole, where initially the split was more equal.
- The findings did not support the expectation of 4:1, male : female ratio in the dyslexic population.

The WAIS-III POI had an important part to play in looking at sub-groups in the dyslexic students at the RI. The characteristics of the dyslexic population included:

- Learning Mode preference showed that avoidance of text was a distinctive pattern compared to other HE students.
- Personality traits indicated that some students were more self-contained and self-aware.
- Motivation for coming to HEI included to 'prove a point' to themselves.

Other findings related to determining sub-groups and the second aim:

- Awareness of dyslexic difficulties and age on entering HE affected the use of key support.
- Age at identification influenced the amount and type of support used.
- Previous experience of support influenced use of HE support.

Additional findings for the second aim, relating to actions and experiences of these dyslexics, included:

- Two thirds of students known to the RI Student Services only made minimal contact (less than five contacts) with the team.
- Over 40% of dyslexic students at the RI had had no support prior to university; this was the case for more than twice as many women as men.
- At least a third of participants reported over-recommendation of equipment.
- Environmental factors were important in personalising students' study conditions, and were significant to study strategies.
- Outcomes were in general a degree class lower than HE averages.

9.2.1 The Nature of the HE Dyslexic Population

As part of the first aim, the first research question addressed the issue of a representative sample of the RI population, putting this in the context of national figures (see *Section 2.4.1*). The national data showed that the dyslexic student population was growing at a faster rate than the HE student population as a whole, and dominated the disabled student population as the biggest single group. Increases in numbers of dyslexic students, especially women, were shown to have occurred with the introduction and widening of access to the DSA (see *Section 5.2.1* and *Section 5.2.2*).

The RI was atypical, being larger than the average size university, with a noticeably higher percentage of dyslexic students. A representative sample for the RI was found to be roughly equivalent numbers of male and female dyslexic students, supporting a move away from expecting a 4:1 ratio of male to female dyslexics (see *Section 2.2.1 – Age at identification and gender*, and *Section 5.5.2*). Compared to national data, there were an above average numbers of female dyslexics, a third of whom were identified for the first time at university. A lower percentage of dyslexic students were over the age of 24 compared to the RI student population as a whole (see *Section 5.2.3*), but it was still greater than the percentage nationally [UCAS data for place acceptance]. It was found that there were more female mature students than men in the dyslexic student population (see *Section 5.5.2* for details of the sample). Male students were more like to have been recognised as dyslexic while at school, which partly accounted for twice as many male students than female making contact before starting their course. Students pre-contacting the RI increased on average through out the 1990's (see *Figure 5.36*). The university's reputation among school support staff for dyslexia support may have contributed to higher numbers of known dyslexics enrolling than seen by Coates (2003).

The fields of study, findings reflected work by James (2003) and Richardson and Wydell (2003), allowing for the specialisations of the RI (see *Section 5.2.4 – Field*). A gender breakdown of fields of study was available for the RI for dyslexic students who left in 2004, which showed that female dyslexic students were most likely to be studying healthcare and business, then humanities. Male dyslexic students were found most frequently in architecture, engineering and business related courses at the RI. Nationally, the class of degree awarded to dyslexic students was less likely to be a First or Upper Second. The RI dyslexic students showed the same peak in Lower Second Class degrees seen in the national data.

Research groups

Analysis of the historic data from RI leavers in Chapter 5 used three (initial) research groups (A-C). Leavers' data suggested that a quarter of the whole sample had little or no indication of dyslexia prior to university. In light of work by Herrington (2001) on the impact of past learning experiences on learning confidence (see *Section 2.2.2 – Personality and study*), a fourth group, Group D, was developed as the research progressed. This group showed a prolonged delay before contacting the support team (see *Section 4.2.3 - Research groups* and *Section 5.4.1*). It was not clear whether this was the result of a self-belief that did not fully recognise the challenges of HE study, or a disbelief in the possible benefits based on past use of support.

Group A were fully aware of their difficulties and put support in place prior to the course as part of 'consciously developing strategies' to cope, and this relates to McLoughlin *et al.*'s fourth level of awareness and compensation (1994, p. 50). The reasons for delayed contact for Group B were various: they gave it lower priority; there were problems with time management, or they had a poorly developed concept of HE study demands.

Research Group C had no idea there was a problem (see *App. 2.2*), mostly relating to the first level of awareness and compensation skills (McLoughlin *et al.*, 1994).

Two thirds of research Group A were under 21 years old and the product of improved dyslexia awareness during schooling (see *Section 7.3.2*). In contrast with Group A, 55% of Group C were aged 21 or older, and nearly 60% were female. Group D, who delayed making contact as long as possible, were predominantly male and under-21 years old. There was very little data on age when dyslexia was first identified or support history for

this part of Group D. Group B were similar in age to Group D, but consisted of nearly 50% women.

Profiles within dyslexia

The second research question aimed to identify characteristics of the dyslexic student and investigate ways of determining any factors that formed the basis for sub-groups in relation to strengths, study and support preferences. The literature review (see *Section 2.2.2*) looked at dyslexic profiles, the impact of dyslexia on self-concept, personality and approaches or methods of study. WAIS (see *Sections 2.2.1, 2.2.2 and 3.3.2 - Intelligence*), Multiple Intelligences (see *Sections 2.2.3 – Learning styles and 3.3.2 - Intelligence*), Learning Mode preferences, and Personality measures (see *Sections 2.2.3 – Learning personality, and Learning styles*) were considered separately and in combination to see what could be revealed about profiles within dyslexia, of RI students.

When asked to complete 15 'Who Are You' Statements (WAY, see *Section 3.3.2 – WAY statements*) to investigate their perception of self, only 4.5% mentioned dyslexia while 13% referred to being a student (see *Section 7.2, Section 7.2.2 – Perception of studying, and Section 8.2.3 – Defining self – WAY*). The statements reflected the findings of Riddick *et al.* (1999), with comments on stress mostly related to school days and in a few cases HE exams. There were also 20 positive statements about having determination, and over 50 referring to being happy or happy about something (see *Section 7.2 – Who are you?*). Some of the interviewees showed confidence (F16):

'I'm proud of my secondary school result actually. I was working quite hard.'
(F30):

'I'm an optimistic person and I trust my own judgements. Very much so'.

WAIS

This research found that dyslexic men at the RI showed significantly higher scores for Verbal Comprehension (VCI) than the women in WAIS-III indices (see *Section 2.2.1*). The correlation between VCI and Working Memory (WMI) did not support use of the Verbal IQ construct used in the WAIS-III test for dyslexic students (see *Section 6.2.1 – WAIS – Data reduction*). A lack of contribution by WMI was seen in the variable's loading in the factor analysis components. Two-step cluster analysis of WAIS indices identified two clusters of participants (see *Section 6.2.1 – WAIS – Cluster analysis*). The analysis indicated that one cluster, Wcl 2, (43% of the sample) showed low means for WMI and PSI, as Grant (2005) found in around 80% of his cases. This cluster would be

prone to distraction, meaning that they have very specific study environment needs. The other cluster, Wc1 1, included higher means for all indices, showing verbal, spatial, and non-verbal thinking strengths. Most were research Group C, with WAIS means that closely reflected the Matched WAIS data (N=33), but this group were twice as likely to use HE support.

Multiple Intelligences

Chapter 6 flagged up a liking for working alone in many cases and a need for holistic understanding of the tasks faced. Responses to the Multiple Intelligence Inventory (MI, see *Section 3.3.2 - Intelligence*)) showed over 83% answering 'Yes' to '*working alone can be just as productive as working in a group*' and 'No' to '*I dislike working alone*'. Riddick *et al.* (1997) suggested that the opportunity to work alone in HE reduced anxiety, which possibly came from the need to use coping strategies when involved in group situations.

Significant gender differences were seen for the 'given' multiple intelligences of Interpersonal and Verbal, and to a lesser degree for Visual. Interpersonal Intelligence relates to working in groups and social interactions. The questions related to Verbal Intelligence asked about speaking or debating, puns and poetry, and writing, with additional questions on visual puzzles and organizational abilities which fell outside the linguistic mode. Visual statements covered use of mental visualisation as well as visual representations. Women's scores for Interpersonal and Verbal Intelligence questions were significantly higher than those of men, and significantly lower on MI Visual statements (see *Section 6.2.1 – Gender issues relating to multiple intelligences*).

In the absence of a statistical method that could demonstrate nine intelligences or the three domains based on McKenzie's dichotomous questions, hierarchical cluster analysis showed five clusters. These five fell into three groups, which were labelled after the method used as 'Ward's Intrapersonal', 'Ward's Anti-verbal' and a combination which could be called 'Spatial'. The Intrapersonal (or self awareness questions) were predominantly answered in the affirmative, while Verbal were answered in the negative (see *Section 6.2.1 – MI Alternative sub-totals*). 'Ward's Anti-verbal' covered the linguistic mode (seeing, hearing and speech) in line with Gardner's intelligences. Intrapersonal covered awareness of values held, motivations and preferences, which had ramifications for study. Remaining 'spatial' questions did not illicit polarised responses.

Learning Modes

For all students, differences in the objective of study have implications for their approach to learning, which can be categorised as deep, surface or strategic (Entwistle, 1997). The objective combined with mode or tool preference of VARK (watching, listening, reading, doing) to affect studying.

Kinaesthetic was the prevalent single learning mode preference in both this study and the design data relating to HE students as a whole (see *Section 6.2.3 – VARK*). The profile from the VARK Learning Modes Questionnaire showed that the dyslexic sample tended to avoid the Read/write mode, making it their least preferred mode, whilst it was the second choice for HE students as a whole. The findings were in line with Riddick *et al.* (1997), who also showed that the common feature for dyslexics was difficulty with a text based or linguistic mode. These findings also supported Mortimore (2003), in that the Visual mode did not dominate dyslexic students' single mode preferences (see *App. 6.75*).

A Multi-modal preference represents a need to look at material in a number of different ways, rather than as an absence of preference. In all 56% of the sample preferred to use more than one mode, reflecting the preferences of university students as a whole, although they were less likely to use all four modes.

Learning Mode preferences proved to be a popular concept, although there was limited research available to support the measure when this study was designed (see *Section 2.2.3 – Learning styles*). Subsequently the intuitive appeal of Learning Modes and the principle that support should make materials multi-modal has been challenged (Coffield *et al.*, 2004; Mortimore, 2003). In support of their relevance, this dyslexic population showed restricted use of text related learning modes compared to data of HE students as a whole (see *Section 7.2.2 – Learning styles*).

Previous exposure to support and multi-sensory teaching did not seem to influence the preference for multi-modal learning. This indicated that when considering whether material for lectures should be tailored to cover a range of preferences, it is necessary to distinguish the presentation of the content from the media, in that a video of a lecture is still auditory despite the use of a visual media. As assignments in HE and life are unlikely to be of a uniform nature, a more realistic solution would be to expose students to a greater

range of modes. Raised awareness of Learning Modes for both students and staff could therefore be the most efficient way to achieve flexibility of approach.

One of the major benefits of administering the VARK questionnaire is that it develops awareness of the different modalities, and so potentially enhances meta-cognitive skills. The ability to select an appropriate mode for a task and the need for flexibility are therefore highlighted. Other measures, particularly MI, have shown the importance of meta-cognitive skills in the dyslexic profile.

Personality

Personality was another potential component of the profile (see *Sections 2.2.2 - Personality and study, and 3.3.2 – Personality survey*). The common dread of a dyslexic is to be found to be 'lazy and careless' instead of dyslexic (see *Section 7.2.1 – Response to identification in HE*). Over half reported that they delaying settling down to work (see *Table 6.19*), from which time management issues should be expected.

This sample was strongly aware of *working hard to achieve their goals*. However, the remaining scores for Conscientiousness questions were low, (see *App. 6.86*) indicating that planning and organisation were poor for both genders. Some of the questions about *striving for excellence* or being *productive* were at odds with the common perceptions of dyslexia, but still received 75% agreement (see *Section 6.2.4*).

The relatively low score for Agreeableness showed that for dyslexic HE students it was important to be self-contained, either to avoid unfavourable comparison with others or to avoid distraction. They were less dependent on others' opinions and potentially rather ego-centric about attending to their needs, including their requirements for study (see *Table 6.20*). There was a moderate positive correlation with MI Interpersonal questions relating to not being social or not liking working in groups (see *Table 6.26*). The very low Agreeableness scores were entirely female. MI analysis had highlighted a liking for *working alone* in many cases, but there was no distinct relation between low WMI, low Big-5 Agreeableness and four related MI questions (see *Appendix 3.4 i.3 – Section 5 (Q6), Section 8 (Q1,3,8)*). Working alone might prevent distraction, discouragement caused by the ease with which others undertook tasks, or reduce stress by the removing the need to mask difficulties by adopting coping strategies in company, in line with findings of

Riddick *et al.* (1997). Working alone also allows for extra hours to be put in to a task inconspicuously.

The results suggested that Openness to change and Extraversion might be part of the coping strategies which dyslexic students develop. Research Group A showed the least extraversion, being more even-paced they were more likely to succeed in HE (McKenzie, 1989) cited in Chowdhury (2006), while Group D were least open to change. Openness to change was the variable that appears most in a table of relationships across measures (see *Table 6.26*), including a moderate positive correlation with the self-awareness skills of MI Intrapersonal.

The distinguishing feature of the Big-5 K-mean clusters was whether Neuroticism mean was high or average score. Cluster 1, with a prevailing personality trait of high Neuroticism and low Conscientiousness scores, were generally identified later (see *Section 7.2.1 – Response to identification in HE*). This cluster accounted for a quarter of the sample population and was 82% female.

Combined measures

The factor analysis reduced the data variables to those found essential to identifying key dimensions of dyslexia in HE students. The most informative clustering, without using WAIS or BDA data, relied on a combination of the measures seen above; i.e. Multiple Intelligence, VARK Learning Modes and Big-5 Personality measures (see *Section 6.3.2*). This was the most suitable combination for factor analysis (see *App. 6.103*).

This factor analysis produced five components, some of which bore a relationship to Cottrell's (1999) study personas and accounted for 60% of the variance. These components formed the potential basis for continuums that could indicate the key aspects of dyslexia. These components supported a number of common observations; for instance, a common strategy used to deflect attention from difficulties with text is extraversion, so to be out-going or become the class clown. Good self-knowledge can be associated with breadth of interests, while people with strong auditory skills tend to use interaction with others as a strategy.

They could be labelled:

1. **Holistic / Analytical** – Breadth of interests and independent thought (Searchlight persona). Verbal.
2. **People skills** – Interpersonal supported by Agreeableness, gregariousness. Auditory.
3. **Organisational** – Logical and Conscientious, self-control and orderliness – Goal driven (Logician persona).
4. **Text based learning and Extraversion**: difficulty with texts results in increased extraversion.
5. **Visual** – Visual learner and spatial awareness, non-verbal acquisition of information.

Where the combined measures included WAIS and BDA, that gave three components in a 'simple' structure (see *Section 6.3.2*), which accounted for 66% of the variance. When WAIS and BDA measures were incorporated in the combined measures analysis, the WMI contributed to the components (see *Table 6.28*). This produced three potential implicit factors being addressed by the combined measures:

- 1) **Outlook** – Personality based coping strategy (see *Table 6.29*): handling stress; gregarious or reserved; expectations of co-operation and help, or competition from others; degree of independence, emotional stability, and self-protection (CmbW 1);
- 2) **Dyslexia** – Memory, sequencing, and learning mode (see *Table 6.30*): working memory, distractibility, and kinaesthetic preferences as covered by working memory combined with specific Learning Mode preferences (CmbW 2);
- 3) **Openness / adaptable** (see *Table 6.31*): self-awareness, introspection, reflection – wide interest, a combination of MI and personality (CmbW 3).

The components represent latent factors that were measured indirectly and might be the focus for further research into such areas as: study persona, self-awareness, self-concept and meta-cognitive skills

Case clusters

It was also possible to look for groupings amongst the participants, in the expectation that relationships could be identified between the terms used to describe the groups of people relate and the components listed above.

Two clusters were recognised, underpinned by WAIS indices combinations and in particular the value of the Perceptual Organisation Index (POI). The groups were relatively similar (see *Section 6.3.3, Table 6.33*). One, denoted Cmb cl1, showed the highest POI standard score mean of 125 and a low mean of 92 for Working Memory Index (WMI). This appeared the most conscientious group, although somewhat distractible. They probably coped by a strategy of working harder. The other cluster, (Cmb cl2) showed a very low WMI (86), and a mean for POI which was substantially lower than for Cmb cl1. A personality of high Neuroticism and low Conscientiousness was indicated. They were more likely to be easily distracted and to need more time to process ideas and actions.

The alternative clusters, excluding WAIS and BDA, produced two clusters with Neuroticism and Extraversion being particularly important in splitting the clusters: CmbA cl1 were more likely to become stressed, with solitary tendencies, showing a high Neuroticism mean and lower Extraversion. The second cluster (CmbA cl2) were more adaptable and sociable, have wider interests and a practical nature. CmbA cl2 showed an average mean for Neuroticism and a better mean score for Extraversion (see *App. 6.108*). Again the clusters were not very distinct, but more so than the previous set.

There is no data to show that CmbA cl1 and CmbA cl2 are specific to dyslexic students only. The inclusion of WAIS and BDA data means that the clusters represent dyslexic specific sub-grouping, as the variation of WAIS means is distinct from the normalised data.

9.2.2 The Actions and Experiences of Dyslexic Students

The second aim of the research was to examine events and responses both before reaching HE and at the RI, and to consider their implications for support provision. Chapter 7 addressed the experience of dyslexia recognition and support. Chapter 8 covered the accommodation of dyslexia and the support personality, using details about the age at which dyslexia was identified [Dyslexia Background], personality and further insights from the interviews.

The medical model of dyslexia implies that dyslexia is an internal issue. The social model, by contrast, sees the problem in terms of society's external dependence on certain abilities.

The model of dyslexia adopted affects the approach to support provision. The model adopted, by an individual, for intelligence and personality is reinforced by experiences at school (Dweck, 2000) and has implications for the expectations of the value of support (see *Section 2.2.2 – Personality and study*). Research Group D included students holding either low expectations of the benefits of support or high self-belief.

Attribution of dyslexic experiences could influence support use and belief in a potential academic-self (see *Section 2.2.2 – Motivation for entering HE*). Where failing outcomes are attributed to fixed factors beyond ones' control, rather than effort (internal, controllable) feelings of learned helplessness can result, according to Dweck and Licht (1980) cited in Forsyth (1986). Along with the career-based reasons of wanting a degree and being interested in taking the subject further, dyslexic students emphasized the wish to 'prove a point' about their ability either to themselves, or other disparagers (see *Table 7.2*). From interviews conducted in Phase Three of this research, it was seen that some students invested extra effort, while others were prepared to use different strategies, thereby maintaining some control (see *Sections 2.2.3 – Coping strategies*, and *8.2.3 – Attribution of outcomes*). The interviews did not address the type of feedback students had received during their education, or whether it was focused on performance goals or mastery of good strategies. The latter forms the basis for a response of 'rising to a challenge' rather than avoiding risks of failure.

An important part of the HE study experience for dyslexic students is having coping strategies in place to deal with the new situation. Some students experienced the need for specific study environments covering issues of noise, movement, heat and light as well as computer settings. Cottrell (1999) has some of the best study strategy advice; for instance, in the sections concerning 'Settling down to study' and 'Organising space for study'. In particular, her approach gives the student the responsibility for deciding what strategies work. The model held of intelligence and personality influences how much a student might expect of support and the impact of meta-cognitive skills. The findings support the literature indicating that the outcomes from degree courses were going to be lower than average (see *Section 2.2.3 – Outcomes*).

Background

In this research, the sample was predominantly English speaking in the home (see *Section 7.1.1 – Sample*) and nearly 20% had been recognised by the age of 11. One of the

important implications of this research was that the timing of initial recognition and subsequent support has potential ameliorating effects on the severity of difficult experienced. In all, 40% of the students had been identified during compulsory schooling. The most common periods for recognition were primary school, then entry to university, with males dominating the numbers for primary school recognition and women the figures at university.

Analysing responses to the question about *support prior to university*, it was found that between 43-47% had had none, which included the women who were unaware of the cause of any difficulties until entering HE. However, of those who had support at school, 63% were women. Even for students who had some awareness of being dyslexic, formally or informally, 27% were unsupported prior to university (see *Section 7.1.1 – Sample*). During the interviews, some students volunteered information about dyslexia within their family (see *Section 8.2.1 – Dyslexia in the family*). The key point related to the recognition of their experiences in other generations. For the mature students who were parents and grandparents, this had often helped to bring about their own identification.

The BDA checklist gave an idea of how the students perceived their difficulties (see *Section 6.2.2*). It showed reading comprehension and other aspects of reading, followed closely by spelling, as the most commonly perceived problems. Men were more concern about their handwriting than women. Women were distinctly more concerned about telling left from right compared to men. Students who reported problems with mental arithmetic, unsurprisingly, were likely to have associated difficulties with learning tables; in the same way, slow readers disliked reading long books. The strongest relationship between perceived problems was that between filling in forms and writing cheques.

Experience of study

From the BDA responses there appeared to be differences between participants' perception of areas of difficulties and those seen from objective tests. When actively engaging with support there was a gender based difference in preferences, with men preferring the module format and women the individual support sessions. In general, the later in life the identification of dyslexia the greater the use of support (see *Sections 2.2.1 – Late identification*, and *2.2.3 – Coping strategies*).

At the RI, 87% of students had some exams on their courses and 49% could or had to include a placement. Placements varied from a year out in industry to having to work

nursing shifts virtually every week to get the required hours for the course. Throughout the historic data period, postgraduate students registered in small numbers, and these increased as postgraduates became eligible for DSA funding.

The dyslexic students in this research had a distinctive profile of Learning Mode preferences, which appeared unrelated to experience of support prior to entering HE (see *Section 9.2.1 – Learning Modes*). Some students commented directly on the experience of being dyslexic and studying, the fear of just being ‘thick’, and the uncertainty of not knowing when things will go wrong (see *Section 8.2.1*).

In the NVIVO package, Effort, Stress and anxiety were nodes created from the WAY Statements as a node set called Study Issues (see *Section 7.2.2 – Perception of studying*). Stress exacerbates manifestation of dyslexia. The attitude to support which the field of study demonstrates, may increase a student’s stress.

Dyslexia was reported as still affecting grades by 40% of respondents and 13% felt that it interfered with their experience of the administrative side, such as registering for modules, and this in turn had an effect upon grades (see *Section 7.3.3*). The data supported reports that the degree class of dyslexic students was generally lower (Richardson and Wydell, 2003) (see *Section 2.2.3 – Outcomes*). The findings for this research showed they had great difficulty achieving Firsts and Upper Seconds, but were awarded a greater number of Lower Seconds and Thirds or Passes than HE students as a whole (see *Section 7.3.1*). Upper Seconds showed larger numbers of students using support.

Experience of support and its use

As well as cognitive or processing differences, the response to dyslexic weaknesses or associated experiences had the potential to distinguish sub-groupings of importance to support provision planning (see *Section 2.3*). Students were not always conscious of some difficulties until they were shown up by objectively given tests. The age at which dyslexia was recognised had an impact on the support profile of students (see *Section 2.3.1*). Those identified later were generally keener to access everything that was available. In the early stages of this research, the older students were not always eligible for DSA support as they might be on part-time courses due to family commitments. Forty-seven percent of dyslexic students were not aware of having previous support.

Data from the historic records showed that large numbers of students actually had very limited contact with the support team, with less than five entries in the contact logs. For many students the experience of contact with Student Support Services was limited to administration-based tasks, such as organising screening for dyslexia, updating existing reports and setting up institution arrangements – exams, dyslexia-aware marking etc. The Leavers' data showed that over 45% of students had made contact for reasons relating to both dyslexia assessment and administrative paperwork in relation to funding or assessments for support needs (see *Section 5.3.1*). Once everything was in place – the exam and library arrangements, dyslexia-aware marking, possibly arranging a support tutor – the vast majority then initiated very little further contact [Leavers']. A small number not already using one-to-one support recognised the need for more help when faced with a dissertation in the final year [Leavers' – Contact reasons].

Over an 11 year period, in the region of 110 people, equally of both genders, had higher contact rates which equated to once or twice a term. There were very few students with a very high rate of contact, but more than three times a term was effectively continuous as issues overlapped. Figures available in September 2004 showed that there were in the region of 1000 students in contact with the Dyslexia support team, of which just 600 were using the DSA provisions. This emphasises the fact that not everyone was able or willing to go on to the Needs Assessment that might lead to a computer and individual support being provided by a funding body.

Women in HE were more likely to be using support for the first time due to delayed identification (see *Section 2.2.1* – Age at identification and gender). Women who were identified at school, however, were more likely than men to have been supported. Older students (over 30 years) made more frequent use of the Learning Skills module and then the drop-in group study skills sessions, neither of which required DSA funding. Older students were even more likely to be female in the HE student population as a whole (see *Section 5.2.3*). A quarter of the sample was using individual support funded by the DSA (see *Section 7.2.3* – Delay and support). The support problems which the students described ranged from putting IT support in place, to problems with the blue cards indicating the need for dyslexia-aware marking, which some well-compensated students felt effectively put a ceiling on grades.

The greatest difficulties with the dissertation element of an honours degree appeared in Group A, but the sample size was small. The use of support suggested that Group A included students who had perfected their skills and needed little further intervention to achieve Firsts. Where support was actively used, Group B proved to have good degree outcomes. Of those who did not actively use support, but did use exam arrangements where applicable, 55% had Lower Seconds, Thirds or Ordinary degrees.

Group C were more likely to use support of all types (Learning Skills module, one-to-one tutor, and group sessions), but the greatest number used the group sessions. The important thing about group sessions was that they could be accessed while the process of formal identification took place. Subsequently some one-to-one support from the university has become available for all students with study issues, without need for DSA funding, and this may have changed the situation. For Group D the favoured form of support was the Learning Skill module, potentially looking for an intensive 'fix'.

Individual support was used by relatively few students and other specialist support (support given with the module or group sessions) tended to last for one term. Exam arrangements and a supply of cards requesting dyslexia-aware marking for course work and exam scripts were the normal level of support. It appeared that around half the students had not used the individual support recommended (see *Section 7.2.3 – Individual support*).

Training on the recommended equipment was also not taken up in many cases. Undergraduates have a great many new academic demands from their courses to handle, whilst at the same time they are faced with new equipment, study techniques, and training recommendations. The problems concerning equipment included total failure to use the recommended hardware or software, and minimalist inefficient use. A computer, followed by a printer, was almost universally regarded as the most helpful equipment recommended. At the time of this research, laptops were taking longer from recommendation to reported use (see *Section 7.2.3 – Equipment*). A cause of delay could have been the additional difficulties experienced in incorporating a laptop into study and classes (see *Section 7.2.3 – Summary of Support*). Up to 20% of the recommended equipment was not purchased according to the survey (see *Section 7.3.3*). Just 9% found ordering equipment stressful, and 18% found that something did not work on arrival.

In all, of 105 students surveyed about equipment, 44% (46) felt that too many recommendations had been made, and they could not easily assimilate all of them into their studies; 35% had abandoned some recommended tool or strategy. Ninety-three students reported being able to make good use of all the equipment recommended, although almost 58% thought that they would have used dyslexia-friendly word processing sessions. Of those asked about the availability of training for the equipment, 42% said that they were unable to get the instruction they needed. Many students also experienced difficulties in following up other provisions recommended, such as obtaining handouts for lectures or reading lists in advance.

9.2.3 Summary of Findings for the Aims

The HE population is not necessarily representative of the dyslexic population as a whole. People who have developed ‘learned helplessness’ in their compulsory education can be generally assumed to have chosen not to come to HE (see *Section 2.2.2 – Goals and models of intelligence*). In both WAIS and VARK dyslexic students showed a distinct profile from HE students as a whole. Age of the student and the point at which dyslexia was identified have implications for patterns of support use in HE and the outcome (see *Sections 2.2.1 – Late identification, and Age at identification and gender*).

The idea of an IQ based profile for dyslexia should not be abandoned (see *Section 2.2.1*). The WAIS-III assessment alone is not a definitive identification of dyslexia, but combined with literacy skills and personal history, it becomes a key element. POI can be used to distinguish between different sub-groups of students. The dyslexic students at the RI showed a marked dislike of the VARK Read/write mode of learning. However, Visual was barely more popular than Auditory, contrary to popular suggestion. While cluster analysis sub-groups for these dyslexic students did not show pronounced differences, there were some. The findings show clearly that the individual nature of the needs of dyslexic students has to be recognised.

Potential profiles of dyslexia, in terms of support use, were considered in *Section 8.3.2*, but found no strong patterns. Lower MI scores linked to a personality that tended to be less open to change but more conscientious in nature, whilst higher MI scores potentially showed wider interests related to better meta-cognitive skills and coping strategies. Meta-cognitive awareness may have related in part to maturity, but elements of awareness of the role of study strategies and self-reliance were seen across the population (see *Section 6.4*).

A small number of students were potentially rather passive about support use, and found it harder to take responsibility for determining their own best learning strategies.

Age and the point at which dyslexia was first identified were found to be strong factors in successful completion of HE (see *App. 7.136*). CmbA clusters showed some differences in the age dyslexia was recognised and registering for support, although earlier recognition did not relate to pre-contact. These factors related to previous support experience or lack of it, before entering HE. The reasons why some students were not recognised as dyslexic until after school were not identified.

Those who had been identified early had already begun to develop a pro-active approach (see *Section 8.4*). Some of the most successful students did not use support provision in HE at all because they came with good skills in place. Some students lacked the academic self-concept to believe they deserved or justified support (see *Section 2.2.2 – Self-concept*). A number of students appeared to hold a model of support that discouraged them from actively seeking support, others felt they lacked the time for it.

One of the surprising things to emerge from the analysis was that attitude and motivation are far more important than particular patterns of intelligence or learning mode for ensuring a successful outcome. The profile of the successful dyslexic student, which emerged, was a person with very strong meta-cognitive skills, aware of their own strengths and weaknesses and able to use a variety of learning strategies to suit the task in hand. This points to the importance of the student's own self-concept as both a learner and a dyslexic. There is a need for further investigation in this area, including links to early recognition, to allow a more holistic approach to support to be developed.

In conclusion; firstly, support works. The rates for both drop-out and failure were shown to be relatively low for dyslexic students known to Student Services. The range of support used varied from passive use of arrangements to active use of all types of tutored support. While dyslexic students who enter HE might be more persistent, clearly registering for support was important to the academic outcome, emphasising the necessity of appreciating the benefits of support in HE study. Outcomes could therefore be expected to improve with more use of study support, particularly by those students who delay contacting Support Services until their second or third year.

Secondly, support is not reaching all students who could benefit from it. Many students who were entitled to it did not use it. Mention was made of feeling a sense of guilt about the amount of support used, even within the dyslexic community, because there was always someone with greater difficulties for which it would have been 'justified'. Higher expectations and self-belief might make fuller use of support acceptable, even warranted in the student's mind, but this was not addressed in this study. This leads to one of the most important principles which emerged from this research; that the concept of support at HE level needs to move away from the idea that it is 'fixing' a deficit. Rather it needs to be represented as something akin to specialist coaching in order to reach ones full potential.

Thirdly, although the recommendations made under the present system and funded by DSA are sufficient, or even too much, they are not always fully or effectively used. Some students do not fully engage with the assessment process and recommendations, subsequently not maximising the opportunities. It is important for the success of support and development of confidence that students define 'their own problems' (Peelo, 1994 p. 18). Ignorance of the prospective benefits of support, equipment and training disempowers some students during assessment. The Needs Assessment process can appear to remove responsibility for engaging with support, contrary to the concept of encouraging a dyslexic student to become their own 'best expert' on their needs. Many students are not getting the full benefit of their recommendations due to conflicting demands on their time or lack of training on equipment and software. The problem of time is particularly severe for students with placements on a weekly basis, who had noticeable difficulty accessing support.

9.3 Limitations

The focus of this research was to improve knowledge about the dyslexic HE student population and their experiences. In the absence of detailed knowledge of dyslexic students in HE at the start, it was felt that it would be too wide a scope to consider additional establishments in an attempt to achieve findings from which to generalise. This research therefore looked at one HEI with several distinct features, namely: the range of courses; the course structure, which was organised in modules and terms; student age range, and support available. The experiences of the students considered had a particular social and environmental context, and this clearly restricted the extent to which the analysis can be generalised. All that can be offered are some general principles, which may be relevant to other Higher Educations Institutions.

There were a number of limitations relating to the design, sample and methodology used for this research. One of the restricting aspects was data collection. The analysis would have benefited from both more complete sets of data across the sample, and a more comprehensive and representative sample, including those studying independently of Student Services recognition. The only successful contacts made with dyslexic students working outside the support of the Student Services team resulted in them both registering immediately. Not enough thought had been given to how to maintain this 'non-contact' sample, particularly as it had arisen as a result of lack of information rather than a conscious decision by the students.

The Leavers' data gave a good idea of the demands placed on the resources of the support team, although much of it was quite old and therefore potentially did not give a good indication of the most recent trends. Students who took the time to answer the questionnaires were more likely to be older, and so both the participant and interview sample was skewed towards an older, predominantly female group of students, although it did cover a range of ethnic and academic backgrounds. There was some redundancy in the number of mature females who were prepared to be interviewed, and a shortage of younger males especially. By not having a representative number of under-21 year old students, especially male, insights into the impact of recent changes, especially in school level support, were limited. With male students more likely to be recognised as dyslexic earlier in their schooling, data has been missed relating to the experience and effects of long term support.

One far-reaching issue concerning research design and methodology was the lack of satisfactory information in the Leavers' data on what form of support was used. In particular, individual support, which might have been charged to the LEA directly by the support tutor or through Student Services, was not always recorded in the contact log.

Postal data gathering ensured that involuntary disclosure of dyslexia to others was avoided, but it left participants with a heavy text burden. One issue was the lack of opportunity to highlight instructions, such as the fact that more than one answer could be selected per question in the VARK tests. Group sessions to complete certain questionnaires would have ensured more standardised conditions and presentation of the instructions, and allowed greater numbers to participate. This would have made the alternative format of

audio recordings of measure questions a possibility. Another problem was that e-mail tracking options were not used to check that follow-up e-mails were being seen. This prevented more carefully focused reminders by other means to students not accessing their university accounts.

While use of self-report measures had implications for the reliability of responses, the sample often responded for altruistic reasons, encouraging the belief that responses were genuine. Students who took the time were more likely to be older. Almost all interviews supported the view that participants felt they took part to help future dyslexic students by sharing their own experiences. This included some students who had been highly successful in life or study. However, one interview showed distinct signs of bias towards meeting the researches perceived needs, and another was treated as an opportunity to air a grudge with life, not the RI specifically. Attempts to check validity included the use of questions in more than one measure, in particular relating to exams on the course and support use (see *App. 7.92* and *Section 7.2.3 – Software*).

Difficulties collecting data led to limitations on the analysis as a result of the variations in sample size. The small numbers of complete sets of data restricted the ability to follow trends across measures, i.e. to correlate WAIS indices, Big-5 personality scores and MI question responses. Further refining of the measures used before the main data collection would have helped this process. The vocabulary used to rate the support scales also needed further investigation, especially the distinction between 'Useful' and 'Helpful'. With a view to collecting complete sets of measures, the belated inclusion of WAIS-III data meant those students with WAIS were not focused on until some had completed their course (see *Section 3.3.2 i – Intelligence*). It would have been helpful to realise sooner the need to distinguish between research Groups B and D. The Data Consent form would have included Group D (see *Appendix 3.4 2.b*), and reasons for initially not using support, and the subsequent change to it, would have been investigated. Other omissions included lack of questions on the Support questionnaires relating to use of photocopying for notes and revision, so preventing the gathering of data on which students used the arrangement, and in what way. This was regrettable as students normally pay for photocopying and there is little detail on how many dyslexic students take up their allowance of 500 pages per year, or why.

In retrospect I would have tackled the data gathering differently, doing it in two stages. Having piloted measures individually, I would have also piloted the set and worked through the data coding as a whole for both entry and analysis. This would have developed a better sense of the measures for which fine detail needed to be addressed in the interview prompts, so maximising the details gathered. Fuller analysis of the pilot data could also have led to a reduction in the number of questions and a slight change to the Course Questionnaire, removing the need for the Modules Questionnaire; in the end, there were not the resources to follow up the latter with repeated completions. More attention could then have been given to structuring the data gathering from passive participants, i.e. those who signed permission to access information, but took no other active part responding to measures. The pilot analysis would then have been used to determine essential information that might not be in Personal Information Portal or Support log data, such as age identified. Potentially piloting the analysis on sets of measures would have prioritised the essential measures from the optional ones. In a small way this would have adhered more closely to the minimal literacy-based tasks principle (see *Section 3.3.1* with reference to Phase Two). Lastly, refinement of the use of node statements in NVIVO would have aided analysis, particularly by use of separate nodes distinguishing positive and negative aspects of the themes found in interviews to aid frequency analysis.

The main limitation of the interviews was their defined scope and the areas the prompts tried to cover. Prompts directed towards the main school period worked quite well and were successful in eliciting data about non-academic achievements and sources of confidence. Investigation of experiences in the work place was beyond the scope of this research, serving only to highlight coping strategies in a few cases. The university-related prompts could have focused more sharply on study and support experiences – covering motivation, effectiveness, and any changes in the grades attained. The prompts did not address the participant's model of intelligence, or their attribution of outcomes at all, and these would have been useful in relation to the view of support. Knowing the importance a student placed on accessing support, in comparison to attendance of lectures, etc., would have increased understanding of the appeal and relevance of the support on offer. In addition, gathering information on self-confidence by looking at success, failure, and confidence boosting achievements, was perhaps less effective than developing other measures which had the potential to generate data that could have been analysed.

A further limitation was that none of the staff working with the students were involved in the research. The perception of staff would have increased the ability to investigate personality measures such as 'Conscientiousness', allowing some distinction to be made between the students' own self reports of 'doing lots of work', and working effectively. There would also have been an opportunity to triangulate the less subjective WAIS test with the various self-report tests and the staff responses. Conversely, staff input would have shed light on whether dyslexic students pass relatively unnoticed in class until assessments arise. In addition, data on acceptance of the appropriateness of dyslexia-aware marking procedures would have benefited the research. There would have been ethical issues about bringing dyslexic students to staff attention if there were doubts about their attitudes and assumptions, or if the student was actually not using the blue card marking scheme for assignments due to a perception of a glass ceiling affect.

9.4 Future Research

Future research might focus on one of the areas covered here: describing dyslexia, including the self-concept and models adopted; self-awareness and meta-skills; support usage and benefits. Further research would need the ability to gather full data within one or more institutions.

One possible project is to use a predominantly web-based survey, which would allow the use of text reading software and completion of measures on-line, with the option of printing the questionnaires to complete by hand. The completeness of data would be improved by these means. In addition, on-line responses would greatly speed up access to the data for preliminary analysis and reduce the need for data entry. Rapid changes in students' familiarity with social networking on-line means that the potential for internet-based quizzes and follow-up reminders or feedback (for example, study recommendations based on the VARK results) would be much greater. Although e-mail addresses and electronic contact details do change, they are much less 'location' dependent than postal addresses, possibly remaining the same for the duration of a course.

Another aspect of obtaining more complete data would be addressed by an approach to the Educational Psychologists recommended by the institution, explaining the interest in the presence of all four WAIS-III indices and literacy data. There could then be a request for the inclusion of this information as an additional technical results page for the duration of the research. Consistent data would give a better insight into differing profiles of dyslexia,

permitting more detailed consideration of any relationship between profiles and learning approaches. Future work in this area would benefit from gathering details of WAIS sub-tests, which could have helped to further distinguish the two combined measure clusters, including handling oral stimuli (see *Section 6.3.3*).

The Module measure was not fully utilised within this research and has little to offer in future research. It was of interest to see the changes in responses to the BDA checklist compared to earlier research. The absence of details of literacy skills meant that this is a measure that could have been omitted with minimal loss of data. It also offered little insight into any gender differences in perception of difficulties. However, removal of BDA from the combined measure factor analysis would have impacted on the three CmbW components identified. Some Multiple Intelligence statements enhanced the data available on verbal issues. The MI measure total or certain sub-totals contributed to the combined measures for both components (CmbW group *Table 6 .28*, and Cmb group *Table 6 .32*) and clusters (CmbA *App. 6 .108*). About 35 of the MI questions should form the basis for a measure about preferences for studying. The Support and Equipment measures might benefit from merging in future, involving the removal of both duplicated questions and the focus on Needs Assessment experiences. Use of the questionnaire on identification, assessment and subsequent support (Farmer *et al.*, 2002, pp. 68-116) would give a better insight into the students experiences.

Further investigation into use of a combination of questions, related to the Conscientiousness in Big-5 and the MI questions that addressed learning strategies, would clarify the study personalities. A longitudinal measure could be developed to demonstrate changes in student strategies during HE study or support, looking at progress towards Heath's 'reasonable adventurer' study personality. It is possible that responses to Conscientiousness questions could be indicating inefficient study techniques and effort hampered by organisation and focus issues rather than laziness. Considering how much time is spent on a task, and how productive that time was, might shed light on the way that ineffective students operate. For instance, some students might be basically conscientious, but are constantly reinforcing a self-concept of being lazy as they have little to show for their effort. Involvement of staff would permit triangulation of data.

Future research might address the impact of withdrawing group support situations at the RI, and the loss of contact with other dyslexic students for newly recognised dyslexics

trying to assimilate dyslexia into their self-concept. The importance to some students may be the proof that the student is 'not alone', and awareness of support and meta-cognitive skill use by others. Group work was often important to students recently identified as dyslexic and accessing support for the first time (ADSHE, 2007). It could be the structure of the course has a role to play in dictating the need for group sessions.

One of the strongest findings of the research was of the importance of meta-cognitive skills for successful study at the level of HE. An important tool for further research into study personality would be the Myself-as-a-Learner scale (MALS) (Burden, 2005), which has now been used with adults and found reliable. The dyslexic self-concept held by a student could be investigated by means of Burden's Dyslexia Identity Scale (DIS), which also has the ability to identify the presence of learned helplessness in HE. In addition, the Approaches and Study Skills Inventory for Students (ASSIST) from the Enhancing Teaching and Learning environments in undergraduate courses project (ETL) could give information on Entwistle's three approaches to learning (1997) and preference for teaching styles.

A useful outcome of this additional research could be the development of an HE study 'toolkit' based on ASSIST and VARK, with MALS and DIS a dyslexia-related add on. These could in turn form the basis of attempts to improve study approach awareness and look at the advantages of these meta-cognitive skills.

9.5 Practical Implications of the Research Findings

Little was known previously about support usage, so the findings of this research provide a useful basis for future planning. The design choices that were made allowed investigation of students' use of support either as a response to stimuli or as intentional actions. The design also aimed to have enough rigour to be relevant to the academic and practitioner communities, with the potential for some generalisation for resource management and policy planning.

This research indicated that 25% of students known to be dyslexic when they left were unknown to the support team in any one year. All students need to be more aware of what support is available, how to check eligibility and how to apply. There is a need to present support as facilitating ease of effective studying, not as a corrective procedure. Support can be a way to increase understanding by clarifying the academic requirements of

departments, in context. A good model is the Study Skills initiative, based in the library, which focuses on using support to improve results, rather than as a corrective measure. This ties up closely with work on facilitating help-seeking at De Montfort University by Bloy and Pillai (2003) and Pillai (2003).

The possibility of holding a meeting at the RI at the beginning of every term (now semesters) or after first module results, should be considered. This would be especially important for those students who are either unidentified when entering the RI or delay contact with Support Services (Groups C and D). The objective would be to provide an upbeat review of support by the central, library based team, for a wider student coverage. This could be done by indicating the sort of problems that might have been encountered and showing how a pro-active attitude (like attending the session) is a good way to reduce problems in the future. It should make clear that there is no need to wait for outright failure before improving skills, and that attention to study skills can be of benefit both personally and in future career development.

The number of pre-course contacts with Student Services has grown, partly as a result of greater links with the Admissions Department, which allowed the pre-contact option to be highlighted to students, increasing the importance of a speedy registration process. There needs to be awareness, when addressing dyslexic students about support, that nearly half of them will have had no previous experience of being supported, but will have been academically successful as a result of adopting strategies or investing a great deal of effort. The majority without prior support experience will be female, whom this research indicated are more likely to use support in HE, especially individual support.

It should be clarified that support does not offer 'cramming' in subject content, but instead addresses means and strategies which allow a student to access that content. Presenting the information in this way can serve to reduce hostility to support use by dyslexic students, especially the successful ones, from other students. It should be emphasised that support aims to expand the number of tools available rather demand a change of strategies, so suggesting increased choice rather than enforcing compliance. Where there has been no experience of choice in the use of support, the reaction is often to exercise the option of avoiding it. The decision to do this should be based on an informed knowledge of personal individual strengths and weaknesses, the demands of the academic course and a correct understanding of what support can offer.

The success of dyslexia support cannot be judged only according to its ability to deliver higher grades. Support success should also be seen in terms of developing motivation and control in order to achieve a sustainable and effective work rate. In turn, a sense of control increases the likelihood of staying on the course. At present, there is no procedure for looking at the course demands and assessing the possible impact of various interventions, based on previous students' feedback.

Attention could be given to developing a better way of addressing the relevant aspects of the needs of the individual, including improving self-concept. For instance, a review of emotional state and confidence level at registration could be used for comparison with the same data after support or at the start of the second year (see *Section 9.4*). The first test would help distinguish students who might benefit from a 'check-up' from those who could be left to track down support if needed. A second test, potentially when the grades start to count to final awards class, would offer the opportunity to gauge the success of interventions, and target further action to aid retention and outcome.

Improved motivation and self-awareness can help develop an effective pro-active learning approach. A pro-active approach to learning can reduce stress by increasing the sense of control, and offers the opportunity to consider a deep approach to learning a topic, rather than staying with surface or strategic approaches (Entwistle, 1997). Students on courses for professions with expectations of on-going staff development would benefit from seeing support in study skills as preparation for this, and not merely as a means to get through university.

The first step would be the development of a self-test toolkit, which allows a student to assess whether there are HE skills that need development, at the same time ensuring that they are aware of meta-cognitive skills and their role in study. The knowledge would be just as applicable to non-dyslexic students as Hurst (2000, p. 2) has stated:

'...approaches to learning, teaching and assessment which are appropriate for students with disabilities are appropriate also for non-disabled students.'

Such a 'toolkit' would therefore be generally beneficial as a preparation for entering an HEI. Outcomes might include greater pre-course contact with Student Services and personalised guidelines for skill development. The second step would be to bring the student's attention to support options after the first set of exams each year.

Since the end of data gathering, the Group Study Skill sessions for dyslexic students have ended in the RI, but a new support service for all students has started. This is based in the library, and can be accessed by individuals, by appointment. The publicity for these sessions has influenced students' attitudes to using support, as all students who want it can readily access the study skills support. The absence of the need to await registration before using this benefits dyslexic students who are delaying the use of support

However, the removal of group support means little attention is given to the 'whole' person, rather than academic strategies. Groups indirectly offer role models by demonstrating, for instance, how another dyslexic might tailor a strategy to suit their own needs. They also encourage a general acceptance that difficulties vary, and demonstrate a range of attitudes to challenges and changes.

Dyslexia support needs can go beyond the common core skills offered by the general access service which has replaced the groups. Some students require explicit introductions to approaches for new levels of study, including dissertations: others need on-going support. As one student put it:

'The most useful thing was the one-to-one support which I had over my dissertation. I would not have got a B without it!' FQ3

Presenting a strategy once or twice may not be enough; the need may also be for the methodological minutia, an 'inchworm' cognitive style (Chinn and Ashcroft, 1993), with steps covering what has to be considered at each stage. Rather than just being told the information, often the key to support is a mental prompt or hook for retrieval.

'I would like some top up sessions on my IT because I easily forget how to use some of the useful things.' F11

Short ad-hoc sessions do not allow a deeper understanding of needs to develop quickly. By contrast, more time and greater continuity or detailed support is available once registered with Student Services as a dyslexic student.

The interviews conducted in the course of this research showed that a number of dyslexics tend to be more self-contained when studying than other students. This approach may be a result of lower processing speeds, a desire to avoid exposing difficulties, or a need to use personal strategies without explanation. The findings suggest that there is a role for dyslexic group contact to help with accommodation of dyslexia into study and self-image. The way that Group A used support indicated that some students would appreciate

exposure to HE study techniques but did not need the intensity of individual support. Research Group C highlighted the need for some support to be in place prior to successful registration with Student Services, and this is one of the advantages of the library-based system; in future, one would expect some students to go on from this to more intensive forms of support.

An important issue of the research was whether academic material given on the courses needed to be modified to suit the learning modality (Visual, Kinaesthetic, etc), or whether awareness of different strategies should be developed to provide the tools and skills needed. The analysis of the VARK measures showed that dyslexic students did show greater avoidance of Reading/writing modality, but the findings did not support the idea of matching instruction mode or materials to learning style. The ability to 'make notes' in a variety of modes is more relevant to successful outcomes. Exposure to different modes and reflection on strategies and what makes them successful is more important than making all instruction multi-modal regardless of content, largely because it encourages a pro-active approach. Being able to reinterpret material in a mode that suits your own profile is one of the most important transferable skills that can be developed in HE, especially in light of the need for on-going professional development in many areas. Analysis of existing knowledge, and of skills and strategies used, leads to a mastery approach to learning goals and prevents risk avoidance. The student is therefore in a position to make an informed decision about continuing with the same goal, or modifying the goal, perhaps by changing course rather than dropping out of HE.

With 40% of students reporting *too many things recommended* (see Section 7.2.3 – Training), the issue of equipment / recommendations needs to be addressed. Pre-Needs assessment introductions to the more common packages, prior to recommendations being made, would allow time for reflection on the value of certain packages in the context of the course being taken. With packages such as Texthelp Read and Write available on the university computer network, a basic trial should be possible before it is purchased. The same goes for use of a scanner. It would in the long run be more cost-effective to organise trials with the equipment, rather than cluttering up the students' space unnecessarily and wasting funds. It may even be necessary to consider staged provision; for example, with input from the support team corroborating the request to purchase more of the recommendations as the initial ones are incorporated into study.

Findings show that training in the use of equipment recommended in the Needs Assessments is being under utilised. In some cases one third of students appear to have not had any support (equipment set-up); in others only a third of them have used a recommended item (software specific). By failing to follow up recommended training for DSA equipment, a potential revenue stream for the RI computer department was seen. An alternative arrangement would be for the university Computer Service to run training groups, as the most common software is already on the network. When signing off for attendance (charging to DSA) there would then be an opportunity for students to indicate whether they wanted more support on their own system. A greater attempt to integrate the equipment into study support sessions would also increase its benefit.

There are various ways in which it would be possible to maximise utilisation of support resources. The use of specific group sessions has already been mentioned. There could also be adjustments to support provision in light of the change of structure for the academic year. This study showed that the second term was the peak registration period for students in both the first and second year, after the first term module exams. This is a particularly significant time for first-year students, as they still have to opportunity to try out new strategies before the module results count to their final award. The switch to a semester format has meant that there are virtually no lectures in January in the lead up to the second semester, which starts at the end of the month. This could offer the opportunity for students to engage in intensive group or individual work. Areas that might be addressed include: a better understanding of the one's dyslexia report in relation to HE study; how to implement Needs Assessment recommendations; HE study skill challenges; workshops in word processing skills and ways to incorporate IT into study workshops; and dissertation issues, for second year students. The final sessions of module courses and exams offer an opportunity to bring these sessions to students' attention. For some students, it would serve as a reminder to do things such as register for support, which the demands of induction and starting a new course, might have delayed.

Two major issues are frequently raised regarding support: namely its purpose and its scope. There needs to be agreement on these matters between the support departments of HE and assessment centres. This research revealed that there are still lingering signs of uncertainty, in both RI staff and students, about whether support should do any more than remove the risk of conspicuous failure, rather than promoting maximum success. Although the object of support might be to 'level the playing field' (Du Pré *et al.*, 2008 p.

40) and permit dyslexic students to fulfil their potential, this is often balanced by the student's objectives to simply complete the course, meet deadlines, etc.

Lack of time for support was therefore a recurring theme. The benefit of support in terms of more efficient study should counter the time spent in support session, but students may need feedback to realise this is happening. The recommendations in the Needs Assessment can be seen as promising a solution; failure to receive the support without explanation, or for it to fail to deliver benefits, is therefore potentially undermining to the students' self-esteem, signalling that the student is not valued enough or is 'beyond hope'. The support offered needs regular reviewing to ensure progress and changes of needs are accommodated.

Several interviews or questionnaire comments indicated that a ceiling effect on assignment marks when using blue cards had been identified by the higher achievers. If this is really happening, it could be that staff are indicating a mistrust of individual support intervention (whether it was used or not) by apparently capping marks. This indicates an area for investigation and consideration within staff development; should the 'levelling of the playing field' be aimed at achieving success based on average expectations or reaching the students' full potential? Where students at large are not all equipped to achieve their full potential, how can one judge the degree of support that would put a dyslexic in a comparable situation? The ideal would be to improve resources for all students, so that all reach their full potential. A possible move in this direction, following a model used by some American universities, is to provide computer specifics for courses, plus the enhanced specifications needed to handle specialist support software when asked. Access to this information gives everyone a sense that they at least know where they should start with equipment, giving consistency of opportunity that does not depend on the knowledge of an assessor, parent or student. Of course, knowing what is needed does not guarantee that all students have access to the equipment, but this would at least be one move closer to a level playing field.

In terms of achieving appropriate support for students, there is a benefit when Needs Assessors have close associations with the HEI. If they have some knowledge of the institution, this helps keep the recommendations well informed, and a sense of the workload and demands can be developed. There can be a conflict between making recommendations which recognise what the student ideally needs, and the awareness that

some provisions cannot be currently be met by an HEI. The solution is for the Assessor to give alternatives in order to ensure that some timely support is offered. In the long term, the HEI may need to address the lack of a resource, but the student may not be able to wait.

The current situation with recommendations risks wasting the money of funding bodies on unused equipment. The implementation of the support should be seen by the student as feasible in context of their study workload. Either less should be recommended, with a sharp focus on what can be accommodated, or greater effort made to ensure that training is used. Feedback on the training should be gathered in order to develop criteria for its use, to predict its relevance and value as support suggestions. This could be fed back to key assessment centres. These research findings showed most people using training found it helpful. If more students can be encouraged to attend a group session on the software packages, feedback could be used to show whether they had found it unexpectedly helpful. Even though students may prove proficient in navigating the basic package, expectations of the package and limited time can prevent the most productive use of the software. The Needs Assessment is often the key time for establishing expectations, which unfortunately are all too often followed by a delay before the use of tools and software begins; this can mean that features or strategies discussed at the assessment are forgotten.

Finally, the very definite relationships revealed by this research between early recognition and pre-university support, and the use made of the university support and the final degree results, suggests it would be more effective to 'level the playing field' in school. There would be enormous advantages to having more technical support in place sooner, including at school, before public exams and HE course choices have to be made.

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Appendices

See Volume II

Glossary

See Volume II